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FINAL PLANNING REPORT
for the

BEAN/COWPEA
COLLABORATIVE RESEARCH SUPPORT PROGRAM

Prepared by
The DEPARTMENT of CROP and SOIL SCIENCES
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Submitted to
The JOINT RESEARCH COMMITTEE
of the
BOARD for INTERNATIONAL FOOD and AGRICULTURAL DEVELOPMENT
and
The UNITED STATES AGENCY for INTERNATIONAL DEVELOPMENT

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Foreword

This Bean/Cowpea Collaborative Research Support Program Plan is the result of twenty months of planning efforts carried out at Michigan State University by a central planning team consisting of Wayne Adams, Pat Barnes-McConnell, and Donald Wallace, the latter on leave from Cornell University, with the frequent, sometimes daily, involvement of John Yohe of US/AID, and numerous U.S. and Developing Country personnel as consultants or advisors on special occasions. Often characterized by what may best be termed "Creative Tension," this multi-disciplinary team evolved a modus vivendi essential to the task of bringing together in a common cause production and utilization-oriented scientists, representing biological and socio-economic disciplines.

Critical support and advice have been given by Michigan State University administrators James Anderson, Ralph Smuckler, Sylvan Wittwer, Irving Wyeth and Dale Harpstead. Important assistance from the perspective of the social sciences was given by George Axinn, Dora Lodwick, Carl Eicher, Linda Nelson and David Wiley. Many others of the MSU administration and faculty also contributed to this effort.

Generous and almost unfailingly non-partisan support and cooperation were received from representatives of developing country institutions, international centers, and most U.S. institutions, all of whom have displayed great patience throughout the long planning process. Many cross-national meetings, both in the U.S. and in host countries, as well as frequent mail communications among collaborators, have resulted in an excellent level of rapport within most of the constituted collaborative

research teams. As the process advanced, it was the Planning Team's privilege to observe the emergence of mutual personal acceptance, professional respect and genuine regard for cultural uniqueness, among the U.S. and host country collaborators. This level of rapport was especially apparent in demonstrations of mutual tolerance of inter-cultural awkwardness and struggles with slowly developing language skills.

The material presented here is divided into five parts. Part I, Articles of a Global Plan for a Collaborative Research Support Program in Beans and Cowpeas, includes a full statement of the philosophy and principles of the Plan.

Part II is a history and report of the Bean/Cowpea Collaborative Research Support Program planning process. It includes a chronology of events and a report on the development of both the global constraint areas and the draft research designs.

Part III is the Global Plan, including the required three levels of funding and a chart showing the extent to which the constraint areas are addressed by the Global Plan.

Part IV is the Management Entity organization and procedures and includes an organizational chart of the total program.

Part V is the set of documenting appendices as referred to elsewhere throughout the text.

Finally, the success of this planning effort is due in no small measure to the efforts of Mrs. Kay Carter, the "behind the scenes" secretary who kept the information, communications, and vouchers flowing. She volunteered to work into the evenings and on many week-ends as one crisis after another surfaced. She was an important agent in bringing this planning effort to fruition.

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P A R T I

ARTICLES
of a
GLOBAL PLAN
for a
COLLABORATIVE RESEARCH SUPPORT PROGRAM
in
BEANS AND COWPEAS

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of a
GLOBAL PLAN
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A. Introduction

The Bean/Cowpea Collaborative Research Support Program (B/C CRSP) is a modest component of the U.S. effort to address famine prevention and freedom from hunger in the developing countries of the world. Beans and cowpeas, as a major source of protein, are a staple in the diets of most of the people of Eastern and Western Africa, Latin America, and the Caribbean. An intensive planning effort has culminated with this plan, the fundamental structure of which consists of research partnerships between researchers from Host Countries, International Centers and U.S. institutions, focused upon problems of production and utilization of dry beans (Phaseolus vulgaris) and cowpeas (Vigna unguiculata).

Special emphasis is placed on the needs and resources of the subsistence farm family, a major producer and consumer of beans and cowpeas and a social group highly susceptible to problems of poverty, hunger and malnutrition. In most countries the large, production oriented, cash crop farms are generally located on the best lands with the most available water and the more favorable climatic patterns. Production on such farms is generally heavily oriented toward export. Thus, the production of food staples, in particular the grain legumes, is not meeting the food needs of expanding populations. To the small subsistence farmer,

therefore, falls the major task of producing these crops, a task made particularly difficult by a variable complex of biological, physical, and socio-economic constraints.

To identify the most important constraints facing subsistence farmers, the planning program has received substantive input from developing country representatives at several stages of plan development. Sources include Ministries of Agriculture, Faculties of Agriculture, organizational representatives, representatives of International research centers, and farmers, both male and female.

Wherever possible the planning team has attempted to exploit the complementarity of the biological-agronomic and the socio-cultural-economic aspects of bean/cowpea production and consumption.

The fundamental strategy of the Bean/Cowpea CRSP is to focus research upon problems of the small subsistence farmers, in their traditional settings, in selected countries of East and West Africa, the Caribbean, and Latin America.

B. Guiding Principles of the CRSP

1. Characteristics of Subsistence Farms and Implications to the CRSP

There are several characteristics which generally describe the small farming systems of these regions. Although there are few firm figures available, all informed estimates place the proportion of beans/cowpeas grown in mixed plantings with maize, sorghum, millets or other crops on small farms as a very large percentage (75 to 35%) of the whole of food legume production in the selected countries. Availability of water for irrigation (and the problems of irrigation management) is often a limiting factor in nearly all of these countries. For example, frequently

the land is too steep, or available water is diverted to higher value crops, or it is too costly to bring the water to the small farm sites. In addition, the small subsistence farmers cannot afford or do not want to incur indebtedness for pesticides and fertilizers. Nor do they wish to make substantial investments in machinery which for their needs and resources may turn out to be of questionable assistance.

Short seasons, periodic droughts, and variable daylengths and temperatures characterize the growing conditions. Soils are often acid, frequently infertile, and often depleted of organic matter.

Because of the absence of a cold winter season and the practice of growing the legume-cereal crop mixture recurrently on the same field sites season after season (or rotated among adjacent small fields), problems of diseases and insect pests are particularly acute and critical to obtaining economic yields. Practically all of the cultural operations are performed by hand, with simple tools, except for the occasional use of oxen for plowing on the more level sites.

All over the developing world, much of the farm work is done by women. In parts of Africa, women select the seed stocks; they break up the soil, plant, weed, harvest, store, and market any surplus over family needs. They gather the fuel and carry the water needed for the long hours of cooking required for beans/cowpeas. Traditional bean/cowpea processing methods are limited and demand high investments of not only water and fuel, but time and labor as well.

Beans and cowpeas provide both protein and carbohydrates to diets of the farm family as well as the urban poor, and are the only reasonable alternative to animal protein which is too expensive for many to buy.

It is particularly important that diets of such foods for the small and growing child be palatable and digestible, produce no undesirable side effects, and provide both sufficient calories and a balance of essential amino acids.

Family goals, family structure, and the rural cultural characteristics of the subsistence farmer are little understood by western crop production scientists, yet consideration of such characteristics is crucial to the issues of appropriateness and ultimate acceptance of more productive farming practices.

The characteristics discussed above are not mere speculation. They have been supported by research and observation, documented in publications, workshops and seminars, and verified in personal interaction with scientists and farmers from the countries participating in this program. Viewed in the context of this attempt to identify the changes which can profitably be introduced into the traditional farming systems, the supportive collaborative research efforts needed from U.S. scientists working with host country professionals are clear:

a. We must address, collaboratively with LDC scientists, the problems of insect and disease control. We may, in the short term, have to rely upon judicious use of non-persistent pesticides and upon novel means of applying them (for example, pyrethrums and ultra-low volume spraying); but for the longer term, we can look to the breeding of pest resistant cultivars, to protective farming practices, and to biological rather than expensive and toxic chemical control systems.

b. We must support the evolution of more productive and more stable production systems. The evolving systems must maintain their adaptation to the variety of conditions on small farms, perhaps utilizing

breeding for higher yields and through improved mixed cropping management.

c. We must address the problem of inefficient nitrogen fixation and phosphorous utilization. In order to escape the tyranny of the spiralling costs of these plant nutrients, we can investigate the development of more efficient cultivars and the evolution of more appropriate farming techniques.

d. We must work to overcome problems of drought, perhaps through breeding more drought resistant cultivars and the development of farming systems that are efficient and conserving in their use of water.

e. We must work toward better nutritive value and digestibility of the food constituents of beans and cowpeas, perhaps through breeding and by methods of food technology.

f. We must promote the creation or operation of seed multiplication programs in order to reach the small farmer with seeds of improved cultivars that are not only genetically superior but that are of sound physical quality and free of seed-borne diseases. The issues of seed availability and credit to women for seed purchases must also be addressed.

g. We must work to overcome or minimize the problem of hard seeds and long cooking time in beans and cowpeas, through both breeding and the use of simple storage or processing tactics, in order to reduce cooking time and fuel requirements.

h. We must help evolve methods of storage and of food preparation that conserve the full value of the dry grains without insect depredation, and that permit retention of full nutritive capability of these grains (or other plant parts, as applicable) when made ready for consumption.

There must be no marked alteration in the grains that detracts from their acceptance as food.

i. We must be cognizant of the interacting and sometimes contradictory results of various agronomic interventions. We must therefore carry out production/consumption-oriented research with socio-economic analysis to assess the acceptability and agro-economic feasibility of proposed interventions. Marketing studies should determine whether improvements, in terms of greater real gain to the farmer, can be made in the system.

j. We must give substantive consideration to major components of the farming system and expecially the human components. We must become sensitive to and knowledgeable about the unique and multiple roles played by women in developing countries as they affect production and consumption of beans and/or cowpeas.

k. We must attempt to maintain an acceptable ecology by encouraging all collaborators to look specifically at the relationship of their research to the agronomic, social and cultural context of the small farm family. Researchers will have to assess the potential of their research for increasing or lessening the frequently overwhelming burden of daily living for such families, an assessment which will suggest the level of acceptance that can be anticipated.

l. We must address a serious problem of research personnel availability by supporting the training of indigenous professional and technical personnel. Trainees at all levels, including post-graduate students, will need to be supported in order to help build a supply of skilled individuals, both men and women, who can conduct useful and needed research and demonstration work with the food legumes.

m. We must facilitate the development of collaborative relationships, not only between U.S. and host country scientists, but cross-nationally among LDC scientists themselves, and among U.S. scientists as well.

It is a major concern of this plan that the procedures of the CRSP facilitate participation by senior U.S. professionals in true partnership with their host country colleagues. It is regarded as especially important that the participants from the U.S. spend some time in the developing country on behalf of which they will be working. Thus, through visitations to institutions, research stations, farms, homes and markets, they should be encouraged to become familiar with the total environment and the specific problems being addressed. Appropriate language training must also be encouraged. The anticipated result is the emergence of a cadre of collegial individuals, confortable and confident with one another, ready to address over the long term the troublesome constraints identified.

2. Strategy for the CRSP addressing Country-specific and Global Objectives.

We have attempted to identify, through all possible means (Appendix A), important country-specific problems which are at the same time shared to a considerable degree by several countries in a region or, indeed, throughout the bean/cowpea world. The information documented (Appendix A) reports some of the means by which country production and utilization constraints were assessed and country programs were identified.

We have attempted to follow the principle that the CRSP should not duplicate existing programs, but should add new dimensions or extensions to existing programs.

The CRSP, according to the strategy envisioned in this plan, would participate with country programs and regional and international centers in research activities designed ultimately to improve production, nutritive value, and utilization of beans or cowpeas by subsistence farmers.

Additionally, as a consequence of the CRSP, there is expected to be produced an increasing body of knowledge and skills essential to continuing applied research for addressing future constraints. Thus, ideally we would not join national programs merely to lend assistance to what those programs are already doing, but would attempt to develop with them a dimension that addresses issues of global concern. Practically, this has not been possible in every host country, but it does appear that the CRSP will stimulate activities and capitalize upon the competencies of individual scientists that would not soon have been undertaken or been made possible otherwise.

In arriving at the present plan we have maintained concern for:

The need for comprehensiveness, including socio-economic as well as agricultural components;

The need to integrate issues concerning the roi of women in agricultural development;

The need for collaboration with international centers;

The need to foster expertise in U.S. institutions;

The need to support some work of a basic exploratory nature, where success would have far-reaching consequences; and

The need for continued training of developing country personnel, particularly at the postgraduate level.

P A R T I I

HISTORY and REPORT
of the
BEAN/COWPEA CRSP PLANNING PROCESS

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BEAN/COWPEA CRSP PLANNING PROCESS

A. History

The Bean/Cowpea Planning Office undertook a thorough identification of LDC problem areas, interests and capabilities and U.S. institutional interests and capabilities. Subsequently, potentials for meaningful research collaboration between the two were explored. The problems of prioritizing the major constraints and of deciding upon the specific research problems to be undertaken collaboratively in each country were solved objectively and openly, often in ways unique to this CRSP (See Appendix B for major decision criteria and persons participating in decision recommending groups). Some of the more critical points in the process included:

1. Receipt of responses from US/AID cables to Country Missions requesting expressions of country interest which report the level of that interest as primary, secondary or tertiary.

2. Attendance of planning team at international grain legume workshops and professional meetings in Africa and Latin America where a good deal of interaction with potential collaborators contributed substantively to program planning.

3. Planning team visits to International Centers and regional and national programs to develop a more thorough sense of the state of the art and some of the current research needs. Visits included trips to small farmers' fields, rural villages, homes and markets.

4. Receipt of research proposals from U.S. researchers used as expressions of interest and preliminary indications of institutional areas of competence and available professional resources.

5. Attendance of planning team at various U.S. professional meetings where additional expressions of interest were received.

6. Peer review and evaluation of U.S. proposals by an international panel of experienced legume and social scientists (See Appendix C).

7. Convening of a group of non-U.S. legume and social scientists to prioritize constraints, suggest needed research and subsequently match this information with U.S. proposal topics (See Appendix D). Although the advice received could not be followed to the letter because of the need to avoid duplication where possible, the need to be comprehensive in the overall plan and the unique geographical distribution of necessary resources, the information was nonetheless most helpful.

8. Corresponding with identified potential LDC collaborators re research envisioned based on the information received up to that point in the process (see examples in Appendix E). Respondents were asked to rank these research items and give additional comments on the backs of the forms.

9. Bringing together one planning officer and two U.S. potential collaborators (chosen on the basis of the information received above) with national program scientists in 12 countries in Latin America and Africa to work out, on site, draft research design outlines (see Appendix G).

A chronology of specific planning office events that include the above activities follows.

B. Chronology of the Bean/Cowpea CRSP Planning Process

July, 1978	BIFAD authorized planning for Bean/Cowpea CRSP.
August, 1978	Eleven Experiment Station representatives met in Chicago authorizing Michigan State University to submit the planning grant proposal.
October, 1978	Planning grant awarded to MSU, effective as of this date.
October, 1978 - June, 1979	Dr. Donald Wallace on leave from Cornell worked with Dr. Wayne Adams of Michigan State in the planning effort.
October, 1978	Letter to Title XII institutions requesting indications of manifest interest -- 43 responded.
October, 1978	Wallace and Adams made orientation trips to University of Missouri and USAID-Washington. LDC questionnaires subsequently developed and disseminated.
December, 1978	Wallace attended Western Regional Project #150 Participants Meeting in Berkeley, California to present a report on the objectives and expected planning procedures of the Bean/Cowpea CRSP.
January - February, 1979	Wallace and Adams visited CIAT, Guatemala, Panama, Costa Rica, Colombia, and Chile. Collected information on constraints. Met potential collaborators.
February, 1979	Adams visited Dominican Republic, FAO meeting. Wallace visited IITA. Collected information on constraints. Met potential collaborators.
February, 1979	Wallace attended Southern Region Meeting of American Society of Horticultural Science in New Orleans to acquaint cowpea workers of the south and southeastern U.S. with the goals and procedures of the Bean/Cowpea CRSP.
March, 1979	Adams attended PCCMCA meeting, Honduras. Collected information on constraints. Met potential collaborators.
April-May, 1979	Fact-finding team visits to South America, Caribbean and Mexico, West Africa, and East Africa--team members from various Title XII institutions. Collected information on constraints. Met potential collaborators.

May, 1979	Bean/Cowpea proposals received from interested institutions responding to RFP. Proposals received from 77 persons representing 25 institutions.
May, 1979	Dr. Pat Barnes-McConnell joined Planning Office.
June, 1979	Wallace, Adams, Barnes-McConnell presented Interim Report to JRC, Iowa.
June, 1979	Barnes-McConnell attended Grain Legume Workshop, University of the West Indies, Trinidad. Collected information on constraints. Met potential collaborators.
June, 1979	International Peer Review Panel Meeting to evaluate proposals received. Sixteen panel experts represented CIAT, IITA, IICA and U.S. senior legume scientists.
July, 1979	Progress report to JRC, Virginia.
August, 1979	Adams and Barnes-McConnell attended Grain Legume Workshop at University of Nairobi. Collected information on constraints. Met potential collaborators.
September, 1979	Barnes-McConnell visited Tanzania, University of Dar es Salaam, College of Agriculture. Collected information on constraints. Met potential collaborators.
October, 1979	Developing Country Advisory Group Meeting, MSU. Reviewed and prioritized constraints relative to country needs. Subsequently matched country needs with U.S. evaluated proposal topics.
November, 1979	Meeting with JRC for approvals of recommended Title XII institutions and meetings with collaborating research scientists abroad.
December, 1979	Meeting of the representatives of U.S. institutions approved for involvement in further planning. Information disseminated. Constraints by geographic areas reviewed. Potential U.S. research teams designed. Proposal writers from institutions not approved for further involvement so notified. Planning extension proposal submitted to Washington. Country constraint research response sheets sent to potential developing country collaborators (scientists and institutional representatives).
January, 1980	JRC meeting--approval of Bean/Cowpea grant extension and funds for overseas trips by U.S. representatives of potential research teams.

March, 1980

Attendance at East African Bean Conference, Malawi, Adams and Barnes-McConnell. Confirmation of constraints chosen for research in Africa. General research discussions with country representatives.

Attendance at PCCMCA meeting, Guatemala, Adams. Confirmation of constraints chosen for research in Africa. General research discussions with country representatives.

March - April, 1980

Meetings on-site of potential collaborators from developing countries and the U.S. -

a) familiarizing U.S. collaborators with the specific resources, problems, and culture of the country in which work is to be conducted; and

b) providing an opportunity for individual scientists of the U.S. and the LDCs to get to know each others' interests, capabilities, and approaches to problem solving, as a sound preparation for:

c) developing specific research designs and budgets to address the problems identified.

April, 1980

JRC meeting -- approval of institutions to be involved in the Bean/Cowpea CRSP.

April, 1980

Bean/Cowpea CRSP Development Meeting, Chicago O'Hare, with the 10 institutions approved for Bean/Cowpea CRSP involvement. Brief report of the collaborators' meetings, review of the draft Global Plan, decisions on the Bean/Cowpea CRSP Management Entity and the initial 5 institutions to be members of the Bean/Cowpea Board of Directors.

May, 1980

Review and comment on draft Global Plan received from participating U.S. institutions. Global Plan finalized for presentation to Washington.

June, 1980

Presentation of Bean/Cowpea Global Plan to JRC.

C. Development of the Statements of Global Constraints

Of the general constraint areas based on the information received, nine (9) major and comprehensive constraint areas have been identified. Broadly defined, they are:

1. Limitations due to Pests and Diseases
2. Plant Response Limitations
3. Limitations of the Physical Environment
4. Farming Practices Limitations
5. Storage and Commodity Maintenance Problems
6. Production-Consumption Economics
7. Nutrition, Food Preparation and Health
8. Socio-Cultural Factors
9. Education, Training, and Research Capability

The first six areas are listed in the order of rank as recommended by the Developing Country Advisory Group (See Appendix F). Because of the heavy agricultural bias of this group it is appropriate to view these constraints in two sections. That is, the first four constraints represent prioritized agricultural production problems and the remaining represent other related areas in bean/cowpea availability, utilization or consumption. Both sections are important in CRSP development and the various components of these sections will be addressed.

Specific problems will be addressed within constraint areas. In recognition of the impracticality of mounting and supporting large, comprehensive research thrust in each of these constraint areas, we have narrowed the areas of proposed activities to the following problems:

1. Lack of generalized disease and pest resistance and/or effective biological control methods in field and in storage
2. Low yields and low yield stability
3. Plant sensitivity to environmental stress and lack of wide adaptation

4. Inefficiency of nitrogen fixation in the field

5. Hard seededness necessitating prolonged cooking time

6. Lack of understanding of traditional farming systems, including pertinent socio-cultural issues and the role of women

7. Difficulties in the digestibility of legume protein, for adults and especially for small children

8. Lack of improved practical processing and preserving methods to insure high quality foods from beans/cowpeas

9. Lack of information on the comparative economic values of introduced technology versus traditional practices (financial, health, labor costs, including sex roles, etc.)

10. Limited indigenous professional competencies to address critical constraints

Clearly, these are not independent problems. They are both interdependent and universal. Based on LDC priorities and other information received, they are problems which are geographically widely dispersed. They were distilled from the broader constraint areas to give guidance to those U.S. and Host Country collaborating scientists who were asked to prepare draft research designs for the CRSP as reported in the following section (See Appendix G).

D. Development of the Draft Collaborative Research Designs which make up the Global Plan.

The Planning Officers considered it of fundamental significance that the U.S. planners not impose their wishes unilaterally upon national programs. However, the reverse was also true in that planning office responsibility demanded concern for comprehensive coverage of constraint areas which minimize expensive duplication of effort. In the spirit of true collaboration, it was determined that the actual functioning research plans would have to be prepared jointly by U.S. researchers and host country program personnel. To that end, the Planning Office, utilizing all the previous information, selected and arranged travel of U.S. scientists

to attend grain legume workshops in East Africa and in Central America where most of the U.S. scientists could meet with potential host country collaborators. U.S. scientists were chosen on the basis of approved institutional affliation, appropriateness of research interest, and overall JRC/AID guidelines. Following the workshops, pairs of U.S. scientists, together with a Planning Officer or designate, returned to the host country to work out jointly with host country personnel the actual research designs (Appendix G).

Information made available to the U.S. participants in advance of travel included returned Country Research Response Sheets, photocopies of demographic, economic, agricultural, political and socio-cultural reference material on the appropriate countries, Planning Office research design development forms with instructions, and appropriate travel information including the names and addresses of the persons with whom they would meet. Information made available to host country collaborators in advance included names and professional addresses of U.S. collaborators, their travel plans and anticipated addresses in the host country. Also included was information about the philosophy and goals of the bean/cowpea CRSP and realistic expectations for the overall pace of program development and implementation (See Appendix H for examples of Planning Office Communications).

As a result of this activity, the draft research designs were developed which became the Global Plan for a collaborative Research Support Program on Beans and Cowpeas.

It should be pointed out, however, that the reality of matching individual country needs and expectations with U.S. scientists' professional goals, within the framework of a global CRSP, has dictated some compromise of the ideal. Global CRSP

plans as presented here focus on universal problems that can be addressed through a local and specific host country linkage, with enough specificity to serve a host country need, and sufficient generality to permit extension of research findings to the region or to the world.

The presentation of the basic minimal research plan (Support Level 1) is an abbreviated form of the individual research design outlines which make up the Global Plan. The full outlines for each research design as worked out collaboratively by U.S., Host Country and Planning Team representatives are given in Appendix G. At this stage they are not binding commitments on either party, but an indication of intent. These plans and budgets will be the bases of formalized agreements to be negotiated upon CRSP implementation.

P A R T I I I

THE GLOBAL PLAN

THE GLOBAL PLAN

A. Three Levels of Support

US/AID and JRC requested three plans be prepared; plans at a minimal, an intermediate, and a high level of funding. Furthermore, it was emphasized that the plans should be qualitatively different.

Our response to these requirements consists of recommendations for a minimal plan which we term "Support Level 1 - The Subsistence Program Plan". The intermediate funding level is the minimal plan plus strengthened country programs in specific dimensions which we identify as "Support Level 2 - The Austerity Plan". For the high-level of funding we designate "Support Level 3 - The Preferred Plan" which is the level 2 plan supplemented by six supporting areas as important adjuncts to the major constraints previously incorporated in the minimal plan. In the level 3 plan we recommend an intensification and strengthening of basic work in the areas of environmental stress, nitrogen fixation, nutrient use efficiency (including salt tolerance), and socio-cultural (including sex linked and economic) constraints to relevant technological development. More in-depth work is also needed in farming systems team development for assessment of bean/cowpea production in countries not included in this initial CRSP, and technical and economic feasibility of production and distribution of the seed of improved varieties to the small farmer. We recommend support for one each of a limited number of U.S. institutions to build a high level of expertise in each of the designated areas. These efforts would be developed jointly with appropriate host-country institutions to serve the entire CRSP.

The plans approach the desired global dimension in two respects. First, the plans address production and utilization problems that are nearly universal to beans and/or cowpeas, calling for a broad range of professional talents from the agronomic to the socio-economic. Second, the host countries recommended for initial work are geographically, ecologically, and culturally diverse, spanning five major regions, namely East Africa, West Africa, Caribbean, Central America, and South America.

1. Support Level 1 - The "Subsistence" Program Plan

Host Country	Host Country Institution	Lead U.S. Institution	Major Constraint Areas*	Problems Addressed	Recommended AID Appropriation
Senegal	Ministry of Agriculture DNRA - Bambey	Univ. of Calif. (Riverside and Davis); Arizona State Univ.	Plant Response Limitations; Limitations of Physical Environment; Limitations due to Pests and Diseases	A program to improve the quality of cowpea varieties for production and utilization in semi-arid zones	
Cameroon	Ministry of Agriculture Institute de la Recherche Agronomique	Univ. of Georgia; Boyce Thompson Plant Research Institute	Limitations due to Pests and Diseases; Socio-economic Factors; Storage Problems	Non-pesticide control of cowpea pests in field and storage	
Nigeria	Univ. of Nigeria at Nsukka & at Jos; Univ. of Ibadan	Univ. of Georgia; Mich. State Univ.	Nutrition, Food Preparation and Health; Socio-cultural Factors	Cowpea Processing and preservation; Child health associated with cowpea foods	
Kenya	Univ. of Nairobi, College of Agriculture at Kabete	Univ. of Calif. (Davis and Riverside)	Plant Response Limitations, Limitations of Physical Environment & Socio-cultural Factors	Drought and heat resistance in disease resistant beans for semi-arid regions	
Tanzania	Univ. of Dar es Salaam, College of Agriculture at Morogoro	Washington State Univ. (USDA); Univ. of Illinois	Limitations due to Pests and Diseases; Production Consumption Economics; Farming Systems Limitations	Bean insect and disease strategies and their economic viability for small farmers	
Malawi	Bunda College of Agriculture	Michigan State University; Virginia State University	Plant Response Limitations; Limitations of the Physical Environment; Socio-cultural Factors	Bean germ plasm evaluation and basis of maintenance of land-race diversity	

Support Level 1 (cont.)

Host Country	Host Country Institution	Lead U.S. Institution	Major Constraint Areas*	Problems Addressed	Recommended AID Appropriation
Dominican Republic	Ministry of Agriculture	Univ. of Puerto Rico; Univ. of Nebraska	Limitations due to Pests and Diseases; Plant Response Limitations of the Physical Environment; Farming Practices Limitations	Producing and testing multiple disease resistant materials for the Caribbean zone	
Honduras	Pan-American School of Agriculture at Zamorano	Univ. of Puerto Rico; M.I.T.A.	Limitations due to Pests and Diseases; Limitations of the Physical Environment; Farming Practices Limitations	Multiple disease resistance testing of beans on small farms	
Guatemala	Ministry of Agriculture ICTA	Cornell Univ.	Plant Response Limitations; Socio-cultural Factors	Nature of wide adaptation in beans and socio-cultural analyses (Replication varying natural environmental factors--see Ecuador)	
Ecuador	Ministry of Agriculture INIAP	Cornell Univ.	Plant Response Limitations; Socio-cultural Factors	Nature of wide adaptation and socio-cultural analyses (Replication varying natural environmental factors--see Guatemala)	
Brazil	Ministry of Agriculture EMBRAPA	Univ. of Wisconsin and Boyce Thompson Pl. Res. Inst.	Limitations due to Pests & Diseases, Plant Response Limitations; Limitations of the Physical Environment	Multiple-disease resistance screening, cowpea insect pathogens, & N-use efficiency	
Guyana	Ministry of Agriculture	Colorado State Univ. & Miss. State Univ.	Farming Practices Limitations due to Pests & Diseases	Cowpea farming systems research & variety evaluation	

Support Level 1 (cont.)

Host Country	Host Country Institution	Lead U.S. Institution	Major Constraint Areas*	Problems Addressed	Recommended AID Appropriation
Regional Center	INCAP	Univ. of Washington; Kansas State Univ.	Nutrition, Food Preparation & Health; Storage Problems	Cooking time and nutritive value	
Intern'l Center	CIAT	Mich. State Univ., Cornell Univ.	Plant Response Limitations; Limitations of the Physical Environment	Bean plant responses to stress, daylength and temperature & N-fixation	
				Project Total	1,847,000
Management Entity		Michigan State University			292,727
				TOTAL	2,137,727

2. Support Level 2 - The "Austerity" Program Plan

Consists of the Level 1 plan -- 2,137,727

Supplemented as follows: 665,000

1. A Bean Seed Quality & Multiplication Program in Honduras or Dominican Republic

2. Strengthening the eleven country programs, by adding $45,000 per program

Malawi:	Add sampling technicians in both agronomic & socio-cultural aspects to reduce overall time to project completion.
Tanzania:	Include more small farmers in the economic comparisons & extend research sites to an additional agro-ecologic zone.
Kenya:	Provide funds for adding cowpea research to the bean project. Kenya, with a large Sahel region, grows and consumes both crops and includes them both in their academic program in legume agriculture.
Nigeria:	Enlarge sample size in both control and experimental groups & add sampling technicians. Increase education and training opportunities for participants.
Cameroon:	Extend the drought resistance work of Senegal and Kenya into Cameroon, and promote integration of East and West African programs of training.
Senegal:	Extend drought resistance testing program into Cameroon and provide collaboration with the Kenya program. Enlarge research program to include additional ecological zones.
Dominican Republic:	Increase number of times tested and number of testing sites.
Guatemala:	Reduce time needed to project completion.
Ecuador:	Reduce time needed to project completion.
Guyana:	Provide sufficient funds to include a full breeding component.
Brazil:	Addition of a cowpea insect resistance breeding component involving the University of Florida.

3. CIAT: No change

4. INCAP: Enlarge germ plasm base used in testing to include the East African gene pool.

5. Management Entity: Hold multinational conferences on beans and on cowpeas to encourage greater communication and cooperation among the host countries as well as among the U.S. researchers.

TOTAL 2,802,727

3. Support Level 3 - The "Preferred" Program Plan

Consists of the Level 2 Plan --	2,802,727
Supplemented by six special supporting programs.	600,000

These programs are as follows:

a. Environmental Stress Laboratory for Beans and Cowpeas, to be established jointly between a U.S. institution and a host country possessing appropriate natural stress conditions.

b. Nitrogen-fixation Effectiveness Laboratory, to be established between a U.S. institution and one or both international centers.

c. Nutrient-Use Efficiency and Salt Tolerance Laboratory to be established jointly between a U.S. institution and an appropriate host country.

d. Farming Systems Research Team combining both production and socio-economic disciplines, formed to analyze bean/cowpea production systems in each CRSP linkage, and to initiate exploratory analyses in other interested countries not presently in the CRSP.

e. International team of food science, socio-cultural and socio-economic scientists, comprising both U.S. and LDC personnel, to evaluate constraints to relevant technological development in zones representative of different cultures and economic levels.

f. Development of high quality seed production systems and techniques for introduction of high quality seed of improved varieties to small farmers.

These suggested programs address issues and problem areas that could not be addressed in sufficient depth in plans described for Support Levels 1 and 2. Furthermore, these programs are consistent with the first two plans, in being directed toward biological and social solutions to problems, and solutions requiring intermediate to low technology. As in the previous plans, these suggested extensions are directed toward small farmers, but the value of breakthroughs in nitrogen-fixation efficiency, environmental stress resistance and nutrient-use efficiency is not limited to the small farmer only.

With respect to implementation, we recommend a minimum of $100,000 per program, plus U.S. institutional matching of 25%. At such time as funds become available, it would be the responsibility of the Board of Directors to select the appropriate lead U.S. institution for each program funded.

TOTAL COST	$3,402,727

B. Distribution of research

A diagram of the Global Research Plan is presented in Figure 1. In Africa it is anticipated that most of the research on cowpeas, a sub-humid to semi-arid crop, will be done in the drier regions of West Africa, Senegal and Cameroon. Because of the excellent laboratory and human resources available in Nigeria, cowpea health and nutrition work have been assigned to that country. Bean research, on the other hand, is envisioned mostly for East Africa, in Kenya, Tanzania and Malawi. These countries have communicated with the Planning Office frequently throughout the planning process and are ready to negotiate the final agreements. Because of the various IITA stations and programs within these countries, it is anticipated that the most appropriate IITA collaborations will be achieved predominantly at these outreach stations.

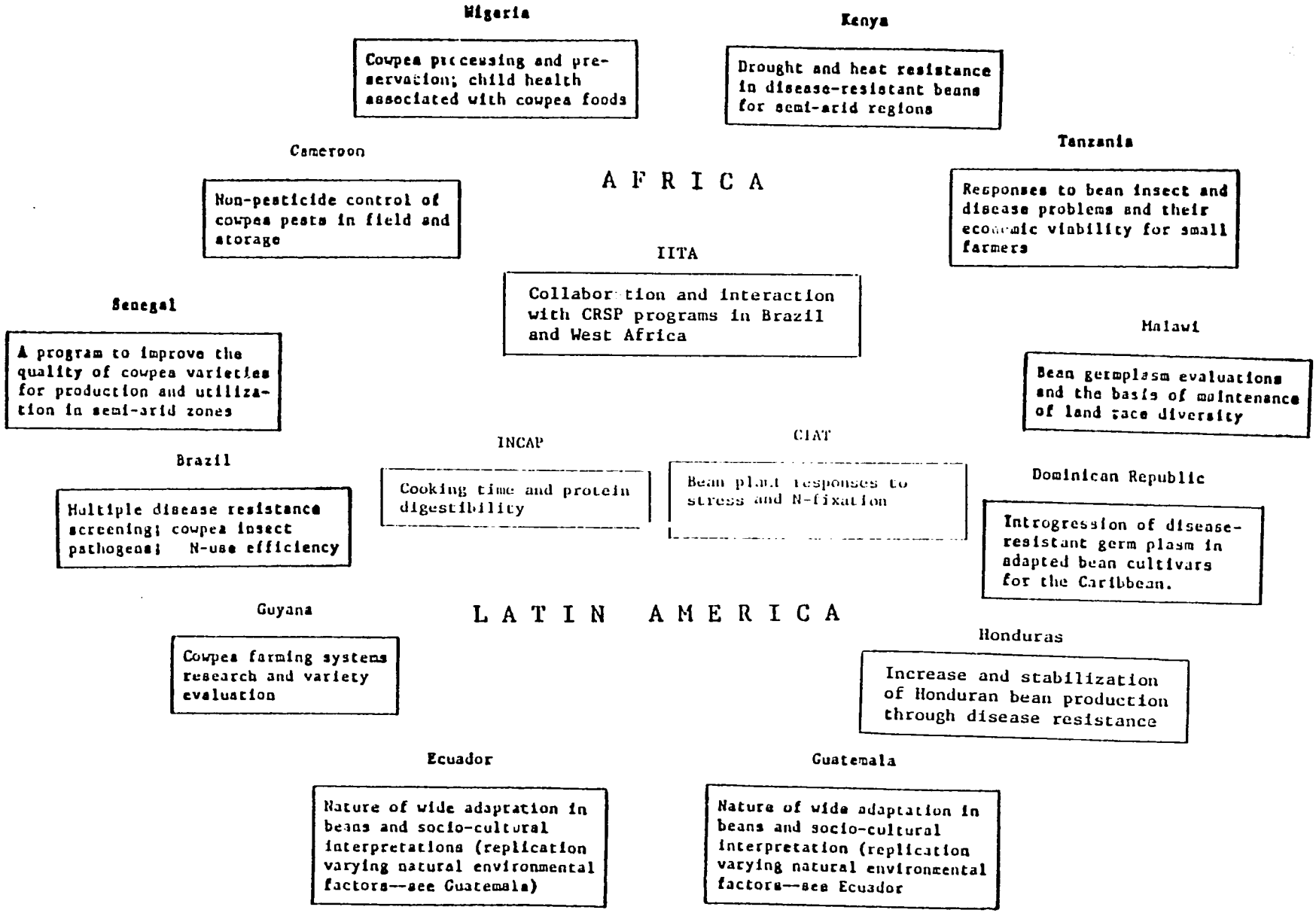
In Central America, South America and the Caribbean, cowpea research is for the most part confined to Brazil and Guyana. The IITA program in Brazil will be the focus of work in that country. Bean research, including replication across ecological zones will be conducted in Ecuador, Guatemala, Honduras, and the Dominican Republic. Among these latter four countries, two of the bean programs will be minimal, large enough only to insure adequate regional trial replication.

The regional nutrition center, INCAP, is ready to collaborate with several of the participating U.S. institutions on problems such as factors affecting cooking time and protein digestibility of beans. The international center in Colombia, CIAT, has held numerous discussions with the Planning Team and expects to participate as indicated.

GLOBAL RESEARCH PLAN

BEAN/COWPEA CRSP

Figure 1


Nigeria
Cowpea processing and preservation; child health associated with cowpea foods
Kenya
Drought and heat resistance in disease-resistant beans for semi-arid regions
Cameroon
Non-pesticide control of cowpea pests in field and storage
AFRICA
Tanzania
Responses to bean insect and disease problems and their economic viability for small farmers
IITA
Collaboration and interaction with CRSP programs in Brazil and West Africa
Senegal
A program to improve the quality of cowpea varieties for production and utilization in semi-arid zones
Malawi
Bean germplasm evaluations and the basis of maintenance of land race diversity
INCAP
Cooking time and protein digestibility
CIAT
Bean plant responses to stress and N-fixation
Brazil
Multiple disease resistance screening; cowpea insect pathogens; N-use efficiency
Dominican Republic
Introgression of disease-resistant germ plasm in adapted bean cultivars for the Caribbean.
LATIN AMERICA
Guyana
Cowpea farming systems research and variety evaluation
Honduras
Increase and stabilization of Honduran bean production through disease resistance
Ecuador
Nature of wide adaptation in beans and socio-cultural interpretations (replication varying natural environmental factors—see Guatemala)
Guatemala
Nature of wide adaptation in beans and socio-cultural interpretation (replication varying natural environmental factors—see Ecuador

SEMI-ARID ZONE

TEMPERATE ZONE

C. Country Programs and Major Constraints

At each point in the process, for both beans and cowpeas, there was concern that the major constraint areas identified must be addressed. Figure 2 is a display of the constraint areas by country giving an indication of the global distribution of the constraint area research. It should be kept in mind that the categories presented are quite broad and several checks within the same category do not necessarily represent the same work.

For example, while both Cameroon and Senegal are slated to do research on cowpea pests, Cameroon is interested specifically in non-pesticide, experimental pest control work with appropriate cooperation with the biological pest control program of the AID funded Crop Protection Service. Their work will include insect life cycle evaluations in relation to multicropping patterns. They are also concerned with the labor demands on the cowpea farmers, traditionally mostly women, and the contribution of the experimental methods to the labor constraints. Senegal, on the other hand, will concentrate on screening and breeding varieties that are resistant to drought and heat as well as pests. Entomological work will include economic assessment of traditional pest control practices. They are interested in the role of multicropping and other farming practices on pest resistant variety performance as a part of a total drought, heat, pest resistant effort.

As previously indicated, a shortage of trained personnel was a major problem in all the countries. Even though some were considerably better off than others, all indicated an interest in increasing research capability through the education of selected students.

COUNTRY PROGRAMS MATCHED AGAINST MAJOR CONSTRAINTS
Figure 2

CONSTRAINT AREAS \ COUNTRY PROGRAMS	Malawi (B)	Tanzania (B)	Kenya (B)	Nigeria (C)	Cameroon (C)	Senegal (C)	Dominican Republic (B)	Honduras (B)	Guatemala (B)	Ecuador (B)	Guyana (C)	Brazil (TITA) (C)	INCAP (B)	CIAT (B)
Limitations Due to Pests and Diseases		✓			✓	✓	✓	✓			✓	✓		
Plant Response Limitations	✓	✓	✓			✓	✓	✓	✓	✓		✓		✓
Limitations of the Physical Environment	✓		✓			✓					✓	✓		✓
Farming Practices Limitations		✓	✓		✓	✓	✓	✓			✓			
Storage Problems				✓	✓								✓	
Production-Consumption Economics		✓		✓										
Nutrition, Food Preparation and Health				✓		✓							✓	
Socio-Cultural Factors	✓		✓	✓	✓				✓	✓	✓			
Education, Training and Research Capability	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

P A R T I V

MANAGEMENT ENTITY:
ORGANIZATION AND PROCEDURES

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MANAGEMENT ENTITY

ORGANIZATION AND PROCEDURES

Based on guidelines previously received, the Planning Team developed a plan for Management Entity Organization and Procedures. As soon as the Joint Research Committee approvals were received, U.S. institutions approved for Bean/Cowpea CRSP involvement were drawn into the process.

A. Approved U.S. Bean/Cowpea CRSP Institutions

At its April, 1980 meeting, the Joint Research Committee of the Board for International Food and Development approved the following institutions for major involvement in the Bean/Cowpea CRSP:

1. California, University of; Davis and Riverside
2. Colorado State University, Fort Collins
3. Cornell University, Ithaca, New York
4. Georgia, University of; Experiment and Tifton
5. Michigan State University, East Lansing
6. Mississippi State University, Mississippi State
7. Nebraska, University of; Lincoln
8. Puerto Rico, University of; Mayaguez
9. Washington State University, Pullman
10. Wisconsin, University of; Madison

These institutions represent a mix of universities having long-supported programs in either beans or cowpeas, or both, with the personnel interested in and experienced in various aspects of producing and utilizing these crops.

Individuals from these universities have participated previously as consultants in the planning process and were the recent visitors to the

developing country programs during which time the specific collaborative research designs were prepared (Appendix G).

B. Management Entity Responsibilities

The Management Entity, through its Program Management Staff and in conjunction with the CRSP Board of Directors and Technical Committee, shall maintain a comprehensive, integrated Collaborative Research Support Program in beans and cowpeas. As the legal and fiscal administrator of funds provided for the Program, the Management Entity shall assume the following duties:

1. Accept total bean/cowpea CRSP funds and responsibility for same.
2. Work out with each sub-grantee institution (each of the approved 10) and each sub-contracting institution the structure, process and procedures for the re-allocation of funds.
3. Negotiate with each sub-grantee institution the desired back-stopping to meet guidelines and regulations.
4. Develop detailed budgets with the U.S. and developing country institutions, including 1 year and 2 year budgets.
5. Effect U.S. agency approvals and be prepared to contribute to congressional presentation if required.
6. Effect necessary approvals from host governments and U.S. institutions.
7. Continue "fine-tune" planning, assuring the integration of all bean/cowpea CRSP activities into a single total research effort.
8. Meet regularly with the Board of Directors regarding policy decisions.
9. Meet periodically with Technical Committee regarding the technical development of the program.
10. Receive annual project summaries.
11. In cooperation with sub-grantees, develop evaluation plans, highlighting critical points in the research and indicating appropriate criteria by which to measure progress.

12. Cooperate with External Review and Evaluation Committee.

13. Cooperate with federal auditors.

14. Facilitate communication, information sharing and feedback among all appropriate parties, U.S. and developing countries, with attention to cross-cultural understandings, communications' translations, and national prerogatives.

15. Confer in advance with each institution regarding travel procedures and regulations and other guidelines to avoid "disallowed" costs to any participating institution. Distribute amendment every six months or as issued.

16. Receive required fiscal documents and facilitate money flow.

C. Program Management Staff

The Bean/Cowpea CRSP will be coordinated by a full time Program Coordinator with executive, technical and fiscal management responsibility. The Coordinator will be assisted by a 1/2 time Assistant Coordinator, a full time Fiscal Officer, and a 1/4 time Women in Development Specialist. This latter position is deemed appropriate because of the dominant position of women in bean and cowpea production in a large number of the B/C CRSP countries. A person to coordinate and review B/C CRSP research activity as it relates to the needs of women in the developing world is of unique importance.

Management Entity Staff

Program Coordinator

Assistant Program Coordinator

Women in Development Specialist

Fiscal Officer Secretarial Staff

D. Management Entity Designation

At a Bean/Cowpea CRSP development meeting held April 28, 1980 in Chicago attended by two representatives from each of 10 approved U.S.

universities and one representative each from US/AID and BIFAD, Michigan State University was unanimously selected as the institution to be recommended to JRC-BIFAD to serve as Management Entity of the Bean/Cowpea CRSP. In accordance with that decision, the planning team recommends Michigan State University for that post. The organizational structure and procedures for program management are presented below.

Board of Directors

The function of the Board of Directors is to establish Bean/Cowpea CRSP policies within the general US/AID and JRC/BIFAD guidelines. All organizational components of the CRSP function under these policies. The Board will be concerned with such issues as total program comprehensiveness, general budgetary levels, representation of appropriate groups at management and project levels and overall operational policy within JRC/AID guidelines.

The Board shall consist of five members, one each from five of the 10 approved U.S. institutions. One of the five member positions shall be permanently assigned to the Management Entity Institution. The other four member positions will rotate regularly among the remaining nine U.S. institutions, the annual rotation schedule to be developed by the Board at its first meeting. Members will serve two year staggered terms. Also at its first meeting the issue of LDC representation on the Board is to be resolved. Such representation is seen as highly desirable but procedures for avoiding severe budget burdens on the program must be addressed.

At the Chicago meeting, the 10 approved institutions voted that the following among them would be the first to serve on the Board:

University of Georgia — University of Nebraska

Cornell University — University of Wisconsin

Michigan State University

It will be the responsibility of the respective Presidents of these institutions to designate their institutional member to the Board with attention given to sexual representation. It is expected that the persons so appointed will come from within the administrative ranks. However, these appointees will be expected to represent the entire CRSP and not his or her respective institution or discipline.

The initial meeting of the Board will be convened by the Management Entity, at which time the Board will select a Chairpers dopt rules of operation, establish procedures for rotating membership, and resolve issues concerning LDC representation on the Board, Technical Committee start-up and general management policy.

F. Technical Committee

The Technical Committee will serve as the principal advisory group to the Management Entity on operational matters. It will function as an internal project review and research coordination panel. Specific responsibilities will include the following:

1. Review applicants for the position of program coordinator and make recommendations to the Board of Directors and Management Entity.
2. Review collaborative research projects to assure that the work undertaken is within the policies and guidelines for the Program, focuses on the agreed upon objectives, and meets professional standards of quality.
3. Maintain a global overview of the CRSP activities to insure that overall Program research goals are being addressed, integration among relevant areas of work is practiced, and procedures for the exchange of information and materials are established and made operational.
4. Initiate, receive, review and recommend as appropriate, new research efforts as may be important to the achievement of CRSP goals.

5. Advise the Program Coordinator on technical matters pursuant to the discharge of the management responsibilities.

The Technical Committee will be composed of seven (7) members serving two year staggered terms. Of the seven (7) members, at least four (4) will be selected from participating U.S. institutions, only one (1) on a rotating basis will represent the two International Centers, CIAT and IITA, and at least one (1) will be a representative of developing countries. The members serving on the Committee will be selected by the Board of Directors. The selection process will insure that four (4) of the seven (7) members represent agricultural production disciplines and the remaining three (3) represent other participating disciplines, together reflecting as near as possible the constraint areas addressed by this Program. Members would be expected to broadly represent their disciplinary perspectives in committee review activities.

The Board of Directors will receive nominees from each of the participating institutions with indications of each nominee's affiliation, discipline and qualifications. The Board will then select the seven (7) committee members with strict attention to academic disciplines, institutional distribution and sexual representation.

The Committee initially will be convened by the Management Entity for organizational purposes to select a chairperson, adopt operating rules and procedures, and agree on meeting schedules.

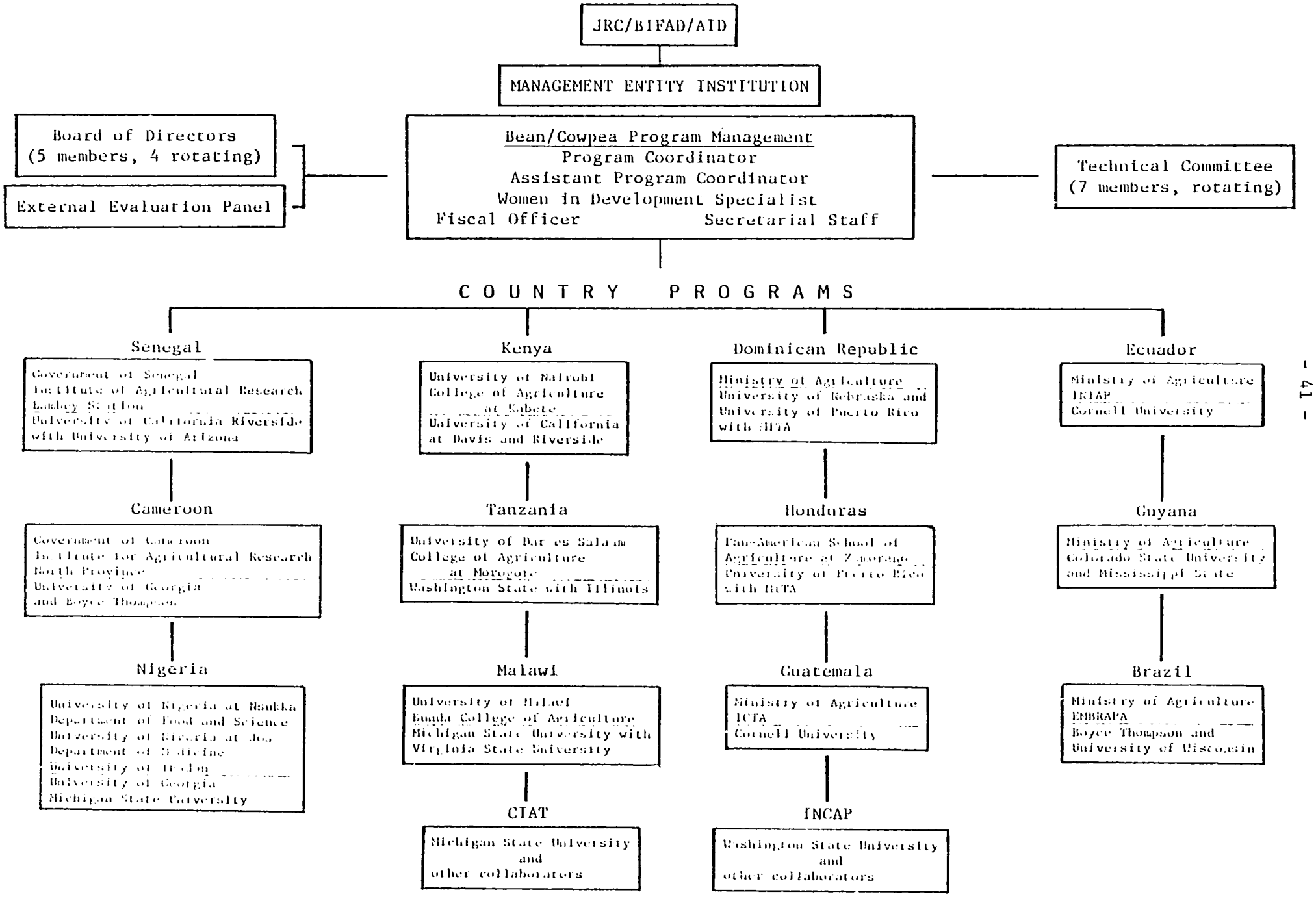
G. External Evaluation Panel

The primary function of the Panel will be to provide an independent external evaluation of the Global CRSP. Recommendations of the Panel will be transmitted to the Management Entity, the Program Coordinator, the Board of Directors, the Technical Committee, JRC, and the Board of International Food and Agricultural Development.

The panel will be composed of no less than three (3) nor more than seven (7) individuals, selected by the Technical Committee, the Board of Directors with the Program Coordinator and approved by the IRC. Its members will be chosen broadly from the international community of leading scientists in the agricultural, socio-cultural, economic and related disciplines. With due attention to geographical, commodity and sexual representation, members will be chosen by the Board of Directors with advice and counsel from the Program Director and the Technical Committee.

The panel will convene at stipulated intervals at the request of the Board of Directors upon recommendation of the Technical Committee and Program Coordinator.

BEAN/COWPEA CRSP ORGANIZATIONAL CHART



I. Management Entity First Year Budget

Personnel

Program Coordinator - full time
Assistant Program Coordinator - half time
Women in Development Specialist - 1/4 time
Fiscal Officer - full time
Secretarial Staff

	Total	$108,100

Management Entity Meetings - including foreign & domestic travel

Technical Committee
Board of Directors
External Review Panel
Project Review
Principal Coordinators' Group

	Total	67,250
Equipment, Supplies and Services		38,800
Indirect Costs		78,577
	GRAND TOTAL	$292,727

P A R T V

APPENDICES

A P P E N D I X A

DOCUMENTATION

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DOCUMENTATION*

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*Revised 11/10/79

**This reference inserted and numbered in this position by error.

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Joint FAO/ECLA Division
Protein Advisory Group of the U.N.
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Dr. Riccardo Bressani
Dr. Ronald Peterson
Dr. Mario Habit
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(Addendum)
4-18-80

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A P P E N D I X B

MAJOR PLANNING OFFICE DECISIONS:
TASKS, GROUPS AND CRITERIA
PLANNING GROUP PARTICIPANTS

TASKS, GROUPS AND CRITERIA

Tasks and Group	Recommendation Criteria
U.S. Proposal Evaluations by Peer Review Panel	1. must address one or more of the problems on the list of LDC endorsed constraints to small farm production of bean or cowpeas in LDC's; 2. must address constraints to greater usage of beans or cowpeas by the poor in LDC's; 3. must address socio-cultural/socio-economic constraints to acceptance and adoption of improved technology; and 4. the inclusion, with any of the above, of a personnel training component. 5. must be ranked as desirable or as essential to a comprehensive, balanced, and integrated bean/cowpea CRSP 6. must reflect the principal investigator's and the sponsoring institution's demonstrated (past) and/or current capabilities for successful implementation; 7. must reflect a potential, either in the short term or long term, for solving or contributing to the solution of the target constraint; 8. must give an indication that the proposed research will lead to effective linkages between the U.S. institution(s) and scientist(s) and their counterparts in the LDC's; 9. must provide evidence, in its suggested procedures, that appropriate work will be carried out in the LDC's; 10. must provide for significant involvement of LDC personnel in the collaborative linkage; and 11. must indicate that approximately 50% of the CRSP funding will be spent in the LDC's.
U.S. Institution Selection by the Planning Office with advice from the Developing Country Advisory Group and other U.S. advisors	1. a demonstrated capability of its staff to provide competent professional guidance and consultation across several disciplines important to the bean/cowpea CRSP; 2. a commitment of the institution to the overall objectives of Title XII; 3. a demonstrated interest and capability of the institution to conduct and/or manage international program in agriculture;

U.S. Institution Selection by the Planning Office with advice from the Developing Country Advisory Group and other U.S. advisors (continued)

4. a previous and/or present involvement in bean/cowpea research;
5. the relevance of the bean/cowpea CRSP proposals, submitted from eligible institutions, to the identified constraints;
6. a capability and commitment of the institution to make available the support services necessary for CRSP success, e.g. language training, etc.;
7. experience in the designated region and willingness of regional LDC institutions to accept the institution.

Collaborating Country Selection by the Planning Office with advice from the Developing Country Advisory Group

1. expression of interest at primary level from AID mission and potential host country
2. some minimal level of research infrastructure (facilities and personnel) with which Bean/Cowpea CRSP could collaborate
3. country agricultural priorities and activity related to this research
4. demographic characteristics which would make a unique contribution to the total comprehensive requirements of the Global Plan
5. AID mission indication that country concerned with areas written in AID/JRC guidelines (small farmer, role of women, etc.)

PLANNING GROUP PARTICIPANTS

August, 1978 - Experiment Station Representatives, Chicago

Experiment Station Representative	Designated Researcher	Experiment Station Representative	Designated Researcher
U. CALIF.-DAVIS Dr. Charles E. Hess	Dr. Carl Tucker	UNIV. OF NEBRASKA Dr. H. W. Ottoson	Dr. Dermot Coyne
COLORADO STATE U. Dr. Wayne Keim	Dr. Donald Wood	CORNELL U. (NEW YORK) Dr. Donald Barton	Dr. Donald Wallace
UNIV. OF FLORIDA	Dr. Mark Bassett	OREGON STATE UNIV. Dr. J. R. Davis	Dr. David Mok
UNIV. OF IDAHO	Dr. L. E. O'Keeffe	UNIV. OF PUERTO RICO Dr. Raul Abrams	Dr. Julio Lopez-Rosa
MICHIGAN STATE U. Dr. S. H. Wittwer	Dr. M. W. Adams	UNIV. OF WISCONSIN Dr. Glenn Pound	Dr. Fred Bliss
UNIV. OF MINNESOTA Dr. Signe Betsinger	Dr. Mark Brenner		

April-May, 1979 - Fact-finding Team Visits

South America:	Dr. Donald Wood Colorado State U.	Mr. David Youmans Washington State U.	Ms. Dora Lodwick Mich. State Univ.
Caribbean & Mexico:	Dr. S. Bradfield Kalamazoo College	Dr. V. Marcarian Univ. of Arizona	Dr. L. O. Copeland Mich. State Univ.
West Africa:	Dr. C. J. deMooy Colorado State U.	Dr. R. L. Fery U.S.D.A. Charleston, S.C.	Mr. Edouard Tapsoba Ouagadougou, Upper Volta
East Africa:	Dr. Glenn Cannell U. Cal.-Riverside	Dr. M. Silbernagel USDA/SEA/AR, IAREC Prosser, Washington	Dr. Wilfred M'Wangi College of Agriculture U. of Nairobi, Kenya

June, 1979 - International Peer Review Panel and Advisory Group, East Lansing

Dr. A. Crispin-Medina INIA Mexico 1, D.F.	Dr. Clibas Vieira U. Fed. De Viscosa Minas Gerais, Brasil	Dr. Lewis Roberts 702 Ellen Lee Ct. Bryan, Texas	Dr. L. Butler Washn. Res. & Ext. Cen. Puyallup, Washington
Dr. R. J. Summerfield Plant Environment Lab. U. of Reading, England	Dr. D. McCloud Agronomy Univ. of Florida	Dr. Frank Byrnes Rockefeller Fdn. New York City	Dr. Olaf Mickelson Food Sci. & Hum. Nutr. Michigan State Univ.
Dr. Donald Wallace Plant Breeding Cornell Univ.	Dr. Peter Graham CIAT Cali, Colombia	Dr. Dermot Coyne Horticulture Univ. of Nebraska	Dr. Wayne Adams Crop & Soil Sciences Michigan State U.
Dr. J. C. Miller Horticulture Texas A & M U.	Dr. Kay McWatters Food Science Univ. of Georgia	Dr. A. Pinchinat IICA Santo Domingo, D.R.	Dr. Pat Barnes-McConnell Crop & Soil Sciences Michigan State Univ.
Dr. Blake Brantley Horticulture Univ. of Georgia	Dr. H. Lionberger Rural Sociology Univ. of Missouri		Dr. Shiv Singh Plant Breeding Cornell Univ. & IITA

October, 1979 - Developing Country Advisory Group, East Lansing

Dr. T. U. Ferguson Crop Science U. of West Indies	Dr. G. Leite Da Silva-Dias EMBRAPA - CNPAF Goiania, Goias, Brazil	Dr. C. N. Karue University of Nairobi Nairobi, Kenya
Dr. Peter Graham CIAT Cali, Colombia	Dr. Antonio Pinchinat IICA Santo Domingo, Dominican Republic	Dr. Peter Goldsworthy IITA Ibadan, Nigeria
Dr. Chris Wien Vegetable Crops Cornell Univ.	M. Emil T. Mmbaga, Grad. Student Michigan State Univ. (Sponsored by Tanzanian Min. Agr.)	Dr. John Yohe Grain Legume Agronomist USAID, Washington, D.C.
Dr. M. W. Adams B/C Planning Office Mich. State Univ.	Dr. Pat Barnes-McConnell B/C Planning Office Michigan State Univ.	Dr. Donald H. Wallace B/C Planning Office Cornell Univ.

December, 1979 - U.S. Institutions Approved for Further Planning Representatives, East Lansing

Dr. M. W. Adams Crop & Soil Sciences Michigan State Univ.	Dr. C. J. deMooy Agronomy Colorado State U.	Dr. Kay McWatters Food Science U. of Georgia	Dr. Barry Swanson Food Sci., Tech. Washington St. U.
Dr. Pat Barnes-McConnell Crop & Soil Sciences Michigan State Univ.	Dr. Jean Due Agricultural Econ. Univ. of Illinois	Dr. David Mok Horticulture Oregon State U.	Dr. Varriano-Marston Grain Sci. & Ind. Kansas State U.
Dr. G. H. Cannell Soil & Env. Sciences U. Cal.-Riverside	Dr. W. H. Gabelman Horticulture Univ. of Wisconsin	Dr. Luke Mugwira Nat. Res. & Env. Alabama A & M U.	Dr. Donald Wallace Plant Breeding Cornell Univ.
Dr. H. R. Capener Rural Sociology Cornell Univ.	Dr. D. J. Hagedorn Plant Pathology Univ. of Wisconsin	Dr. M. Rangappa SEA/CR/USDA Virginia State U.	Dr. B. D. Webster Agron. & Range Sci. U. Cal.-Davis
Dr. Dermot Coyne Horticulture Univ. of Nebraska	Dr. C. F. Konzak Agronomy & Soils Washington State U.	Dr. L. D. Satterlee Food Sci. & Tech. Univ. of Nebraska	Mr. J. Zapata-Acosta Ag. Econ. & R. Soc. Univ. of Puerto Rico
Dr. A. Wayne Cole Plant Path. & Weed Sci. Mississippi State U.	Dr. J. Lopez-Rosa Agr. Experiment Sta. Univ. of Puerto Rico	Dr. Richard Soper Boyce Thompson Inst. Ithaca, New York	

March - April, 1980 - U.S. Research Team Representatives to host countries to meet with potential collaborators

Dr. M. W. Adams Crop & Soil Sciences Michigan State Univ.	Dr. Jean Due Agr. Economics Univ. Illinois	Dr. George Hosfield Crop & Soil Sci. Michigan State U.	Dr. Barry Swanson Fd. Sci. & Tech. Washington St. U.
Dr. Cyril Akpom Community Health Sci. Michigan State Univ.	Dr. George Freytag USDA/ARS Mayaguez, Puerto Rico	Dr. Richard Hughes Plant Research Boyce Thompson Inst.	Dr. J. G. Waines Bot. & Plant Sci. U. Cal.-Riverside
Dr. Pat Barnes-McConnell Crop & Soil Sciences Michigan State Univ.	Dr. Peter Gore SUNY Plattsburgh Chazy, New York	Dr. J. Lopez-Rosa Agr. Exper. Station U. of Puerto Rico	Dr. D. H. Wallace Plant Breeding Cornell Univ.
Dr. Larry Beuchat Food Science Univ. of Georgia	Dr. D. J. Hagedorn Plant Pathology Univ. of Wisconsin	Dr. V. Marcarian Plant Sciences Univ. of Arizona	Dr. B. Webster Agronomy & RangeSci. U. Cal.-Davis
Dr. Richard Chalfant Entomology Univ. of Georgia	Dr. A. E. Hall Bot. & Plant Sci. U. Cal.-Riverside	Dr. Luke Mugwira Nat. Res.& Env. St. Alabama A & M U.	Ing. C. Chiriboga Legumes Prog., INIAP Quito, Ecuador
Dr. C. J. deMooy Agronomy Colorado State U.	Dr. Woodrow Hare Pl. Path. & Wd. Sci. Mississippi State U.	Dr. M. Silbernagel USDA/SEA/AR, IAREC Prosser, Washington	Dr. G. R. Ammerman Horticulture Mississippi State U.

April, 1980 - Approved U.S. Bean/Cowpea Institutions CRSP Development Meeting, Chicago

		Administrative Representative	Technical Representative
Univ. of Calif.	B/C*	Dean Calvin Qualset - Davis Assoc. Dean, College of Ag. & Environmental Sci.	Dr. C. Cannell-Riverside Soil & Environmental Sci.
Colorado State U.	B/C	Dr. Donal D. Johnson College of Agr. Sciences	Dr. Donald Wood Agronomy
Cornell Univ.	B	Dr. J. F. Metz, Director International Agriculture	Dr. Donald Wallace Plant Breeding
Univ. of Georgia	C	Dr. Darl Snyder, Director International Development	Dr. Richard Chalfant Entomology and Dr. Larry Bauchat Food Science
Michigan State U.	B	Dean James Anderson College of Agr. & Natural Resources	
Mississippi State U.	C	Dr. R. R. Foil, Director Mississippi Agr. & Forestry Experiment Station	
Univ. of Nebraska	B	Dr. R. W. Kleis, Dean of International Programs and Assoc. Dir. of Nebraska Agr. Experiment Station	Dr. Dermot Coyne Horticulture
U. of Puerto Rico	B	Dr. George Pringle Assistant Director Experiment Station	Dr. Julio Lopez-Rosa Crop Protection
Washington State U.	B	Dr. Landis Boyd, Director Agr. Research Center	Dr. M. J. Silbernagel USDA, Prosser, Washington
Univ. of Wisconsin	B	Dr. Robert Hougas, Director Experiment Station	Drs. F. Bliss and W. Gabelman Horticulture

BIFAD/JRC

Dr. Woods Thomas
Past Executive Director
BIFAD

Dr. John Yohe, Acting Chief
Agricultural Production
Office of Agriculture, USAID

Bean/Cowpea Planning Office

Dr. M. Wayne Adams
Dr. Pat Barnes-McConnell

*As indicated by each institution's administrator at the CRSP Development Meeting 4/28/80.

A P P E N D I X C

EXAMPLES

of

PEER PANEL EVALUATION DOCUMENTS

for

U.S. PROPOSAL REVIEW

BEAN/COWPEA CRSP PROPOSAL EVALUATION FORMS

NAME_____

STATUS: Panelist or Advisor

PROFESSIONAL ADDRESS:

PHONE:

HOME ADDRESS:

PHONE:

INSTRUCTIONS FOR REVIEWING PROPOSALS

1. Summary of the Research Proposal.

The Planning Office has provided on page 1, a summary of the identified (CRSP Assigned No.) proposal. This summary is an abbreviated encapsulation of the Principal Investigator's own words. These abbreviated encapsulations are for the areas (see summary on page 1) of: (1) potential LDC collaborator(s), (2) proposed activity in LDCs, (3) research-training objectives, (4) experimental materials and/or subjects, (5) experimental methods, and (6) subject matter area and objectives.

2. Reviewer Evaluation of the Research Proposal.

A. Improve on the Planning Office-provided summary.

With the complete proposal in hand, you should check it against the encapsulation and add, delete or modify as seems appropriate to you.

B. Philosophy

The final Bean/Cowpea Collaborative Research Support Program should emphasize, as much as the state of expertise permits, collaboration and activities with LDC personnel and also training of LDC research personnel. It should include training U.S. students for future Bean/Cowpea research and collaboration with LDCs, and it should include appropriate basic research and socio-economic research.

C. General comments, suggested modifications and subjective scorings.

Space for the reviewer's general comments, suggested modifications and for subjective scores of six or seven facets (A thru I) of the proposal is provided on the summary sheet (page 1) to the right of the encapsulated summaries. The unused space on the back of the summary sheet may be used to continue your statements, i.e., your comments or suggested modifications.

D. Subjective scoring.

To facilitate easy comparison of the subjective scores of different reviewers, we suggest that all use the scoring procedure as given for A thru I on the back of this page. Expansions of the concepts to be evaluated for A thru I are as follows:

(A.) As per your own judgment, score the priority of the subject matter area for inclusion in the Bean/Cowpea CRSP plan. Peer panel reviewers and advisors may delay this until discussion of the desired complete and balanced plan has occurred.

(B.) As per your own judgment, score the past involvement of the principal investigator and/or institution in LDC activities that are pertinent to the CRSP. This must come directly from the proposal; this is not encapsulated on the summary sheet. Comments about your evaluation will be in order.

(C.) As per your own judgment, score the commitment to LDC linkages as you perceive it from the linkages suggested within the proposal (not encapsulated on the summary sheet.)

(D.) As per your judgment, score the potential contribution to training of LDC personnel for doing research, assuming the proposal is implemented as suggested by the principal investigator. Use the proposal directly and also the summary sheet to draw your conclusions. You should suggest proposal modifications which would strengthen the effectiveness of the research-training benefit to the LDCs.

(E.) As per your judgment, indicate the ultimate potential contribution from the proposal toward improving LDC teaching and extension capabilities.

(F.) Some proposals may be near-identical in subject matter area, objectives, etc. But, there will inevitably be differences. To help you identify similar proposals, please note the following information contained in the CRSP-assigned proposal number.

B the proposal is for work on Beans.
C the proposal is for work on Cowpeas.
BC the proposal is for work on Beans and Cowpeas.

I. Fertility, Plant Nutrition and Environment)
II. Farming Practices and Management) The Roman numeral(s)
III. Genetic Limitations) indicates the
IV. Plant Pests) constraint area(s)
V. Utilization and Storage) addressed.
VI. Socio-cultural and Socio-economic)

From the above information it can be discerned, for example, that Proposal B-I-III-3 is for work on beans (B) in the constraint grouping of Fertility, Plant Nutrition and Environmental limitations (I). The proposal is also concerned with the constraint grouping of Genetic Limitations (III). The number 3 indicates this is the third proposal that was so classified. Complete identity or dissimilarity of the subject matter area to be researched by two or more proposals must be determined by comparing the Subject Matter Areas and Objectives as given on the summary sheet, or better by direct comparison of the proposals.

(G.) You, or the collective group of peer reviewers, may decide that some non-indicated criterion is important. Enter it here and score as indicated.

(H.) Recommendation: Indicate your final recommendation for incorporation or non-inclusion of this proposal in the Bean/Cowpea CRSP. Your suggested modifications should be stated in the space provided on the front or back of the summary sheet.

(I.) Same as G.

PLEASE USE THE FOLLOWING SCORING PROCEDURES:

		Range of Scores	Enter your score in the space at the right (on the summary page) of each (A-I) column.
A.	Priority of Subject matter area	1-5	1 = minimum or very low priority, and 5 = maximum or highest priority
B.	Past involvement in LDC activities	1-5	1 = minimal involvement 5 = maximal involvement
C.	Capability & commitment to LDC linkages	1-5	1 = minimal linkage proposal 5 = maximal linkage proposal
D.	Potential contribution to LDC research-training	1-5	1 = minimal training of LDC researchers 5 = maximal training of LDC researchers
E.	Potential contribution to LDC teaching and extension	1-5	1 = minimal 5 = maximal
F.	Relative rank among similar proposals	1--The No. of similar proposals	1/3 = lowest of three) two or more 5/5 = highest of 5) may have equal rank, or be complementary
G.	?? Use this space for a criterion not given above	1-5	1 = minimal merit for CRSP 5 = maximal merit for CRSP
H.	Recommendation:	Acc or Mod or Non	Acc = (Acceptance of Proposal for inclusion in CRSP plan) Mod = (Modification(s) are suggested) Non = (Rejection; non-inclusion in the CRSP plan)
I.	?? As for G. above.		

CRSP Assigned Proposal No.	Constraint Area (I thru VI)
B-1-III-6	I. Fertility, Plant Nutrition, Environment III. Genetic Limitations

Source of Proposal

Principal Investigator(s)	U.S. Institution(s)
M. H. Gabelman	Univ. of Wisconsin Dept. of Horticultur
G. C. Gerloff	Botany

Potential LDC Collaborator

LDC Scientist(s)	LDC Institution(s)
Dr. P. Graham	CIAT, Colombia Microbiologist
Prof. F. A. A. Couto	EMBRAPA, Brazilia, Brazil

Proposed Activities in LDCs

After three years, when the combinations of P efficient vs inefficient x P responders vs non-responders have been developed, the plant material will be tested in LDCs.

(Page 1)

Proposal Title

Synthesis and Evaluation of Beans Efficient in Phosphorus Utilization

Yearly Budget

$88,493; 25% from Wisconsin; None to be spent in LDCs at this time

Research-Training Objectives

Graduate student training.
Sabbatic-type stays of LDC scientists at University of Wisconsin

Experimental Materials and/or Experimental Subjects

Phosphorus efficient vs. inefficient genotypes; Phosphorus responding vs. non-responding genotypes; Nitrogen fixing vs. non-fixing genotypes.

Experimental Methods

Crossing and backcrossing to incorporate all phenotypes into two varieties, followed by testing in LDC fields that have low phosphorus

Subject Matter Area & Objectives

Efficient Utilization of Phosphorus.

Primary objectives: 1) Transfer P efficiency and inefficiency two commercial cultivars.
2) Select among the efficient and inefficient versions of each cultivar for lines that respond to high P efficiency and lines that do not respond.
3) Field test the few combinations (efficient users responders vs. non-responders) in fields with low P.
4) Combine the above characteristics with N fixing and non-fixing genotypes and test in fields.
5) Continue search for even more P efficient germplasm.
6) Determine the mechanisms of differential P efficiency and response.

General Comments From Reviewers

Continue on other side of page if needed.

Suggested Modifications or Additional Comments

Please label as comment or modification.

Continue on other side of page if needed.

CRSP Assigned Proposal No.

B-III-IV-2

Constraint Area (I thru VI)

III. Genetic limitations
IV. Plant pests

Source of Proposal

Principal Investigator(s)	U.S. Institution(s)
J. Lopez-Rosa	Univ. of Puerto Rico
G. Freytag	USDA, Mayaguez

Potential LDC Collaborator

LDC Scientist(s)	LDC Institution(s)
Staff	CIAT, Colombia
	PCCMCA
	IICA-CATIE

More than 15-20 collaborators suggested.

Proposed Activities in LDCs

Activities to be on Univ. of Puerto Rico campuses.

Proposed Title

Development of multiple disease resistant beans for the tropics.

Annual budget: $496,859; other details not given.

Research-Training Objectives

Short term training; M.S. degree training; post doctoral, sabbatic opportunities.

Experimental Materials and/or Experimental Subjects

Beans with disease resistance.

Experimental Methods

Recurrent selection procedures will be used to accumulate the many disease resistance into commercially acceptable types. Detailed procedures are given for each objective.

Project Purpose and Objectives

1) Develop recurrent selection populations (RSPs) in specific groups of Phaseolus Vulgaris for high frequency of major and minor genes for multiple disease resistances. 2) Select, test and release advanced lines for combined multiple disease resistance, yield & commercial potentials. 4) Develop RSPs in closely related Phaseolus species (P. coccineus, others) for important diseas resistances not presently found in the common bean, specifically, bacterial blight (Xanthomonas sp.), angular leaf spot, soybean rust and BGMV. 5) Maintain the networ of cooperators in LDCs and of interested principal bean scientists in the US who are willing to receive and use disease resistan germ plasm, and participate in trials of improved disease resistant germ plasm (advanced lines, cultivars) in the principal bean production areas. 6) Provide training in Puerto Rico to cooperators and ntudents from LDCs. 6) Hold workshops whereby US scientists and scientists and cooperators from the tropics may meet to discuss and work on timely subjects.

General Comments From Reviewers

Continue on other side of page if needed.

A. Priority of Subject matter area
B. Past involvement in LDC activities
C. Capability & commitment in LDC linkages
D. Personal contribution
E. LDC research-training
F. Potential contribution to LDC teaching and extension
G. Sensitive mass among similar proposals
H. Recommendation: (Circle 1 or 2)
Acc. (Acceptance)
Mod. (Modification)
Non. (Non-inclusion)
I.

Suggested Modifications or Additional Comments

Please label as comment or modification.

Continue on other side of page if needed.

CPSP Assigned Proposal No.

B-IV-III-1

Constraint Area (I thru VI)

IV Plant Pests
III Genetic Limitations

Source of Proposal

Principal Investigator(s)	*U.S. Institution(s)*
D. P. Coyne	Univ. of Nebraska Dep. of Horticulture
M. L. Schuster	Pathologist Dep. of Horticulture

Potential LDC Collaborator

LDC Scientist(s)	*LDC Institution(s)*
Dr. E. Yoshii	ICTA, Guatemala
Dr. S.H. Orozco	ICTA, Guatemala
Dr. N. Valladares	Venezuela
Dr. H. Leyna	Plant Breeder, Tanzania
Temple & Schwartz	CIAT, Colombia

Proposed Activities in LDCs

Cooperation will be with LDC scientists. Establish test plots with cooperators in LDC's and evaluate pathogen management systems including rotation, clean seed production, bacterial survival and multiple resistant germ plasm or advanced breeding populations.

Proposal Title

Bacterial Blights of Dry Beans: Epidemiology, Genetics and Breeding for Resistance

Research-Training Objectives

LDC graduate students will be trained at Nebraska; their thesis research could be done in the LDC's.

Experimental Materials and/or Experimental Subjects

Germplasm with different genes for resistance to blights and with resistance to different strains of blight. Varied strains of the bacterial pathogens. Genotypes with multiple disease resistances from CIAT.

Experimental Methods

The different plant genotypes will be tested against the different bacterial strains and the disease symptoms and pathogenicities tested and the genetics of the resistances studied. Breeding strains that will give more stable forms of resistance will be used. Survival mechanisms of the pathogens will be followed.

Subject Matter Area & Objectives

Bacterial Blights of Beans
Specific objectives: a) to detect and characterize genetic variability, pathogenesis, population dynamics, and host-parasite relations; b) to study effects of biotic and abiotic factors on epidemiology; c) to produce disease-free seed; d) to identify resistant genotypes to different bacterial strains and determine genetic control; e) to investigate genetic control of morphological and physiological components of resistance; f) to investigate and use effective breeding systems for multiple resistance.

General Comments From Reviewers

Continue on other side of page if needed.

A. Priority of Subject matter area
B. Past involvement of LDC scientists
C. Usefulness to countries
D. Research contribution
E. LDC research-training
F. Research emphasis
G. Recommendations: Accept, Acc. (Acceptance), Mod. (Modification), Non-Acc.

Suggested Modifications or Additional Comments

Please label as comment or modification.

Continue on other side of page if needed.

CRSP Assigned Proposal No.
C-1-III-1

Constraint Area (I thru VI)
I. Fertility, plant nutrition, environment
III. Genetic limitations.

Source of Proposal

Principal Investigator(s)	*U.S. Institution(s)*
V. Marcarian	Univ. of Arizona Dep. of Plant Science
A. K. Dobrenz	
Cooperators:	
K. Rasul	Univ. of Colorado
C. L. Tucker	Univ. of California

Potential LDC Collaborator

LDC Scientist(s)	*LDC Institution(s)*
Dr. E. E. Watt	IITA - Brazil (associated with EMBRAPA)
Cowpea scientists	IITA - Nigeria
Open	Open

Proposed Activities in LDCs

Graduate students and post-doctorate will work in LDC's.

(Page 1)

Proposal Title

Systematic Improvement of Yield in Cowpeas in LDC's with Emphasis on Drought Resistance.

Research-Training Objectives

Graduate students, postdoctoral fellows, and senior LDC scientists will function in the project. Senior LDC scientists will be given sabbatic privileges at Arizona. They will do the work with drought tolerant materials in the LDC's.

Experimental Materials and/or Experimental Subjects

Heat and salt-tolerant lines from U. of Arizona. Photoperiod insensitive lines from U. of Cal. High-temperature-insensitive lines from Colorado State. Symbiotically efficient lines from Texas. Elite lines from IITA and other LDC locations.

Experimental Methods

An Arizona-located, continuous-irrigation gradient system in which 300 entries x 2 replicates of cowpea cultivars or 600 entries x one replicate can be evaluated under 5.6 cm to 76.0 cm of water for the growing season. In subsequent years photosynthesis, respiration and nitrogen fixation, and heat and salt tolerances will be assayed. The best selected lines will be used as parents for a breeding program and made available to all institutions.

(Page 1)

Subject Matter Area & Objectives

Drought resistance, yield in cowpeas

Objectives:

1. Investigate variability within cowpeas for drought tolerance.
2. Determine the drought tolerance of lines from cooperating LDC and U.S. Institutions.
3. Conduct on-site trials on small farms in dry-tropic LDC's.
4. Characterize the physiological nature of drought tolerance.
5. Devise a diagnostic index suitable for use in LDC's.

General Comments From Reviewers

Continue on other side of page if needed.

A. Priority of:
Service needs etc.
B. Host advantages of:
LDC activities
C. Usefulness & commitment to LDC climates
D. Potential contribution:
to LDC education-training
E. Potential contribution:
to LDC teaching and extension
F. Adequate rank among various proposals
G.
H. Recommendation (circle one):
Acc. (Acceptance)
Mod. (Modification)
Non. (Non-acceptance)

Suggested Modifications or Additional Comments
Please label as comment or modification.

Continue on other side of page if needed.

Assigned Proposal No.

C-III-1-1

III - Genetic Limitations

I - Environment

Cowpea (Vigna unguiculata L. Walp.) Varietal Improvement for Semiarid Zones

Annual budget $199,558; 27% from UCR; 10% to be spent in LDC.

Source of Proposal

Principal Investigator(s)	U.S. Institution(s)
A. E. Hall	University of California (Riverside) Dept. of Botany & Plant Sciences
K. E. Foster	Botany & Plant Sciences

Research-Training Objectives

To train scientists in agronomy, plant physiology, genetics, plant breeding. To train these scientists to contribute to rural development in LDCs through course work and experience with the research project at UCR. Senior LDC scientists will spend sabbatics at UCR. PIs will provide short training sessions.

Potential LDC Collaborator

LDC Scientist(s)	LDC Institution(s)
M. Thiello	Senegalese Institute for Agricultural Research; Iaflar, Senegal
C. Dancette	
T.P. Singh	IITA, Nigeria
	IITA, Upper Volta
K.L. Buhr	Brazil/Rockefeller

Experimental Materials and/or Experimental Subjects

Cowpea varietal development

Proposed Activities in LDCs

The PIs will visit cowpea institutions in Africa and South America. The research will have cooperative programs in Senegal, Nigeria, Upper Volta, Brazil and possibly other LDCs.

Experimental Methods

First Year: Visits to Senegal, develop plans for cooperation; exchange germplasm, discuss breeding methods & selection criteria, Expand research at UCR to develop character selection tests. Develop further systems for evaluating yield stability.

Second Year: The systems for selecting developed at UCR will be initiated in LDCs and supported through pass through funds. Crosses be made between genotypes from Senegal and California

(over)

Overall objectives: To develop improved cowpea cultivirs for semiarid zones.

Long Term Goal: To provide agricultural systems to farmers in semiarid zones that will ensure their livelihood and ability to produce adequate food supplies irrespective of variations in weather and economic conditions.

Specific Objectives: 1) Develop screening tests for earliness, heat resistance at flowering, drought tolerance and improved root and shoot characteristics. 2) Incorporate these characteristics into suitable backgrounds. 3) Apply successful screening tests in California and encourage use of these procedures in LDCs. 4) Develop disease lines and populations having novel combinations or adoptive characteristics using parental material developed in difficient climate zones. 5) Evaluate in fields in semiarid Africa, South America, and California, using advanced but appropriate management methods.

General Comments From Reviewers

Continue on other side of page if needed.

A. Priority of Subject matter area

B. Past involvement in LDC activities

C. Capability & commitment to LDC linkage

D. Potential contribution to LDC research-training

E. Potential contribution to LDC teaching and extension

F. Relative rank among similar proposals

G.

H. Recommendation: (Circle 1 or 2)
Acc. (Acceptance)
Mod. (Modification)
Non. (Non-inclusion)

Suggested Modifications or Additional Comments

Please label as comment or modification.

Continue on other side of page if needed

CRSP Assigned Proposal No.
C-V-VI 1

Constraint Area (I thru VI)
V. Utilization and Storage
VI. Socio-cultural and Economic

Proposal Title (Page 1)
Village-Scale Process for Production of Cowpea Flour

Subject Matter Area & Objectives
Cowpea flour production in villages
Overall objective: To increase use of cowpeas by rural and urban consumers in West Africa.
Specific objectives are to develop methods to:
1. Destroy insects in field dried, shelled peas and prevent reinfestation before milling.
2. Mill to a flour while maintaining nutritional and functional properties
3. Package at acceptable cost.

Source of Proposal

Principal Investigator(s)	*U.S. Institution(s)*
K. H. McWatters	Univ. of Georgia Food Science Dept.
R. D. Phillips	
L. F. Flora	
M. S. Chatman	
R. E. Worthington	

Research-Training Objectives
1. To transfer the technology to developing countries by cooperative work with scientists in West Africa and by training a Nigerian graduate student and by involvement of socio-economists.

Potential LDC Collaborator

LDC Scientist(s)	*LDC Institution(s)*
Dr. P. Ngoddy	University of Ife Nigeria
C. E. Williams	Univ. of Ibadan, Nigeria Dept. Agr. Economics and Extension

Experimental Materials and/or Experimental Subjects
Cowpeas to be milled into flour, and the milled flour incorporated into traditional foods. Varieties used will be native to West Africa.

Experimental Methods
Various methods of removing skins and eyes and destroying insects will be tested. Flours that include the skins will also be made and all will be organoleptically and functionally evaluated by incorporation into the native dish akara. Storage methods will be tested. Nutritional quality will be evaluated.

Proposed Activities in LDCs
Duplicate equipment will be used in Univ. of Georgia and an LDC lab. After three years the process will be expanded to include social scientists and extension personnel, and perhaps entrepreneurs to commercialize the process.

General Comments From Reviewers

Continue on other side of page if needed.

Suggested Modifications or Additional Comments
Please label as comment or modification.

a. Priority of Subject matter area
b. Past involvement of LDC scientists
c. Capability & commitment of LDC cooperator
d. Potential contribution to LDC development
e. Potential contribution to LDC economy and country
f. Relative rank among similar proposals
g.
h. Recommendation (check 1 or 2)
Acc. (Acceptance)
Mod. (Modification)
Rej. (Rejection)

Continue on other side of page if needed.

CRSP Assigned Proposal No.

BC-IV-VI-1

Constraint Area (I thru VI)

IV Plant Pests
VI Socio-Economic

Proposal Title (Page i)

Pest and Disease Control for Multi-Cropping Bean/Cowpea Production Systems

Source of Proposal

Principal Investigator(s)	*U.S. Institution(s)*
A. P. Elliot	Michigan State Univ. Entomology
G. W. Bird	Entomology
R. F. Ruppel	Entomology
A. W. Saettler	Botany & Plant Pathology

Potential LDC Collaborator

LDC Scientist(s)	*LDC Institution(s)*
Dr. C. Braithwaite	Univ. of West Indies St. Augustine, Trinidad
Dr. J. E. Edmunds	Windward Islands Banana Research Center, St. Lucia, W. I.

Proposed Activities in LDCs

Almost all of this work will be in the West Indies.

Research-Training Objectives

(1) Graduate level training
(2) Extension-type-training

Experimental Materials and/or Experimental Subjects

Bean and Cowpea Experimental and farmer fields.

Experimental Methods

A survey of the insects, nematodes, bacteria and fungi will be conducted on selected experimental and farm sites.

Financial and economic analysis will be done using project worth measures of benefit/cost ratio, net present worth, and internal rate of return criteria, and based on questionnaires.

Subject Matter Area & objectives

Pest and Disease Control

Overall objective: To determine effect of insects, nematodes, bacterial and fungal diseases on bean/cowpea multi-cropping production systems, and evaluate effects of control practices on crop yield and socio-economic conditions of small farmers in the West Indies.

Long term goal: To develop an understanding of the interactions of pests and diseases in a bean/cowpea multi-cropping system and to develop pest control programs designed, to optimize yields and economic returns, hereby improving the social and educational aspects of the community.

General Comments From Reviewers

Continue on other side of page if needed.

A. Priority of Subject matter area
B. Past involvement of LDC scientists
C. Capability & commitment of LDC scientists
D. Personnel considerations
E. Facilities considerations
F. Economic considerations
G. Socio-cultural considerations
H. Recommendations: Accept, Acc. (Acceptance), Mod. (Modification), Nons. (Non-sponsorship)

Suggested Modifications or Additional Comments

Please label as comment or modification.

Continue on other side of page if needed.

CRSP Assigned Proposal No.
BC VI-2

Constraint Area (I thru VI)

VI Socio-cultural and Socio-Economic

Proposal Title (Page 1)

Some Aspects of Socio-Economic Constraints.
Beam/Cowpeas - Africa

Source of Proposal

Principal Investigator(s)	*U.S. Institution(s)*
J.R. Due	Univ. of Illinois Dept. Agr. Economics
Potential LDC Collaborators	
D.T. Eteki	Min.of Econo. Planning Buea, Cameroon
Dr. F. Kamajou	Univ.of Yaounde Agricultural Economics
Staff	Univ.of Ghana, Legon
D.Adjei-Boahn	Univ.of Ghana Dept. of Vegetable-Crops

Potential LDC Collaborator

LDC Scientist(s)	*LDC Institution(s)*
Faculty	
P. Kabahyo	Makerere University Kampala, Uganda
E. Rubahyo	Research Station, Kampala
Dr. H.Karpacheer	IITA Economist, Niger a Tanzanian Ministry & Agriculture
M. Mwaiko	Univ.of Dar es Salaam
J. Sambuja	

Proposed Activities in LDCs

The PI will oversee and participate in data collection in the LDCs. LDC scientists and LDC graduate students will also participate.

Research-Training Objectives

Would cooperate with the LDC people as fully as possible to support them and strengthen their institutions.

Experimental Materials and/or Experimental Subjects

Experimental Methods

Existing data will be pulled together and additional data gathered to fill the gaps. There is need for these socio-economic areas to be more integrated with additional constraints.

Subject Matter Area & Objectives

1. Inadequate availability of credit to small farmers.
2. Incentives lacking for small farmers
3. Small farmer family sociology not understood.
4. The role of women who do 60% of all farming and assist with the other 40%.

The PI has done such studies in Tanzania, Zambia and Sudan since 1974.

General Comments From Reviewers

Dr. Due only learned of the Beam/Cowpea CRSP about two weeks before submitting this tentative proposal.

Continue on other side of page if needed.

A. Priorities of Subject matter area
B. Role advancement of LDC scientists
C. Capability & commitment of LDC Cooperators
D. Research contribution to LDC situation-planning
E. Research contribution to LDC situation-planning
F. Possible contribution to LDC training and extension
G. Research with groups
H. Research with groups
I. Recommendations for Acc. Assistance Mod. Modification

Suggested Modifications or Additional Comments

Please label as comment or modification.

Continue on other side of page if needed.

A P P E N D I X D

DEVELOPING COUNTRY ADVISORY GROUP MEETING:

WORK DOCUMENTS (1 through 6)

BEAN/COWPEA CRSP WORK DOCUMENT 1 (IDENTIFICATION)

Name _____ Representing Region _____

Please review Planning Document A. On the basis of your knowledge of your region, write your region in under "Geographic Area" below, next to problems you know to be major ones in your region. Indicate the types of research you feel would be appropriate for finding solutions to these problems under "Suggested Solutions". List as many different types of research as you wish.

Constraint	Problem	Geographic Area	Suggested Research Solutions
I	A. Problems of chemical or physical properties of soil		
	B. Deteriorating land quality (erosion, compaction, etc.)		
	C. Water inadequate or excessive, especially during most critical time & temperature		
	D. Temperatures too high or too low		
	E. Nitrogen fixation & phosphorous use efficiency		
	F. Wide variations in soils, climates, elevations, environmental resources with a given country		
	G. Molybdenum requirements		
	H. Altitude effects		
	I. Sources of firewood for cooking rapidly being depleted		
	J. Inadequate or non-existent irrigation facilities		

LIMITATIONS OF THE PHYSICAL ENVIRONMENT

Constraint	Problem	Geographic Area	Suggested Research Solutions
II	A. Insects in soils		
	B. Insects in seedlings		
	C. Insects in foliage		
	D. Insects - stem boring		
	E. Insects - pod boring		
	F. Animals or birds destroy crops		
	G. Fungal diseases		
	H. Bacterial diseases		
	I. Viral diseases		
	J. Nematodes		
	K. Weeds inadequately controlled		
	L. Insects have become resistant to insecticides		
	M. General pests and disease problems		
	N. Development of integrated pest management strategies: Chemical, biological, cultural, social		
	O. Disease resistant screening techniques needed		
	P. Relationship of pest damage to plant stages and zonal influences		
	Q. Factors affecting infection, multiplication and distribution of disease organisms		

PLANT PESTS AND DISEASES

Constraint	Problem	Geographic Area	Suggested Research Solutions
III	A. Low fertilizer response		
	B. Yields strongly affected by wind and weather		
	C. Low/non-nodulation at the farm level		
	D. Other crops more productive		
	E. Cultivars not adapted (daylength, temperature, etc.)		
	F. Poor competitiveness in intercropping		
	G. Inherent yield potential too low - especially in favored varieties		
	H. Maturity, length of growth cycle		
	I. Sensitivity to drought and/or cold		
	J. Instability of performance		
	K. Assemble and evaluate indigenous germ plasm collections - germ plasm exchange		
	L. Physiological studies: plant efficiency, limitation of sinks, abscission, photo-respiration, etc.		
	M. Poorly structured plant types characterized by: long vegetative phase preceding flowering and continuing through reproductive phase, large leaf area index, low ratio of seed to non-seed portions, self-shading, too viny and prostrate, plant architecture		
	N. Nitrogen fixation problems including effects of high soil temperatures		
	O. Sensitivity to lodging		

PLANT RESPONSE LIMITATIONS

(cont. next page)

Constraint	Problem	Geographic Area	Suggested Research Solutions
III (cont.)	P. Water use efficiency		
	Q. Plant nutrition & mineral efficiency		
	In 232 bean fertilization trials in Brazil responses were noted in following frequencies: N - 67 times, P - 103, K - 15, lime - 31, micro-nutrients - 17		
	R. Fertility trials and mineral toxicity		
	S. Climatic zonal contribution to plant, rhizobial responses		

PLANT RESPONSE LIMITATIONS

Constraint	Problem	Geographic Area	Suggested Research Solutions
IV	A. Livestock waste used for other than fertilizer		
	B. Low stand establishment		
	C. Yield losses during growing season		
	D. Harvest losses		
	E. Seed quality (pathogens, saprophytes, physical)		
	F. Farmers do not use modern measures to control diseases and pests		
	G. Developed technologies are inappropriate		
	H. Herbicide tolerance in mixed cropping systems		
	I. Mixed cropping constraints and suitability		
	J. Management (especially as it relates to small farms): tillage methods, rhizobial systems, timing, populations and spacial arrangements, utilization patterns		
	K. Understanding of farmers' reasons lacking		
	L. Fertilizer practices inadequate or indiscriminate relative to zone		
	M. Indiscriminate use of insecticides		
	N. Criteria for choice of varieties		
	O. Land preparation untimely and inadequate		
	P. Hand harvesting		
	Q. Constraints of monoculture		

FARMING PRACTICES AND MANAGEMENT

Constraint	Problem	Geographic Area	Suggested Research Solutions
V. PRODUCTION/CONSUMPTION ECONOMICS	A. Economics of fertilizer availability -- use and response		
	B. Land is not available		
	C. Modern inputs are too costly		
	D. Equipment not available or too costly		
	E. Controlling insects is uneconomical		
	F. Pesticides unavailable or can't afford them		
	G. Risks are inherent in trying new technology		
	H. New techniques not financially feasible		
	I. Inadequate availability of credit and inadequate skill in use.		
	J. Incentives lacking		
	K. Farmers adapt modern technology to other crops but not to beans		
	L. Farmers get only a small share of the retail market price		
	M. Marketing		
	N. Socio-political-economic systems limit the small farmer		
	O. Small farmers have no political power - need cooperatives but not trusted		
	P. Economics of nutrition		
	Q. Assessment of governmental economic infrastructure: input supply, credit availability, extension support		

(cont. next page)

Constraint	Problem	Geographic Area	Suggested Research Solutions
V. (cont.)	R. Risk aversion as small farmer motivator		
	S. Large grower needs to include cultivars for mechanical harvesting and incentives.		
	T. Inability to afford animal power		
	U. Export markets within continent		
	V. Economics of alternative production systems		
	W. Other crops more profitable		
	X. Economic analysis of various farming systems approaches		
	Y. Impact of zone on costs of production		
	Z. Economics of processing and commercialization both as seed and for human consumption		
	AA. Determination of most suitable area for commercial production		
	BB. Scarce and expensive energy resources		
	CC. High labor costs		
	DD. Economics of women's roles		

PRODUCTION/CONSUMPTION ECONOMICS

Constraint	Problem	Geographic Area	Suggested Research Solutions
VI	A. Post-harvest losses		
	B. Seeds become too hard when kept too long		
	C. Maintenance of nutritive value in storage		
	D. Appropriate "village" technology for storage responsive to unique conditions but frequently inadequate		
	E. Diseased seed or pest infested		

STORAGE AND COMMODITY MAINTENANCE

Constraint	Problem	Geographic Area	Suggested Research Solutions
VII	A. Home processing difficulties		
	B. Beans cause problems as a food for young children		
	C. Ease of cooking - takes too much fuel		
	D. Low protein digestibility		
	E. Low methionine or methionine availability		
	F. Tannin content		
	G. Gastro-intestinal or other disease limit human activity		
	H. Grain nutritional quality & assessment on living organisms		
	I. Antimetabolites & flatulence		
	J. Heat treatment, toxicity & nutritive values		
	K. Dietary habits inadequate - amino acid assessment		
	L. Seed quality and size relative to yield and nutritive value		
	M. Malnutrition & nutrition needs		
	N. Scarce firewood for cooking		

NUTRITION, FOOD PREPARATION AND HEALTH

Constraint	Problem	Geographic Area	Suggested Research Solutions
VIII SOCIO-CULTURAL FACTORS	A. Beans are not a preferred crop/food		
	B. Dietary habits of different ecological zones		
	C. Cowpea texture - grittiness		
	D. Color and size of seed not acceptable		
	E. Flavor and texture are not acceptable		
	F. Farmers aspire to occupations other than farming		
	G. Importance of class in problems, resources, options and motivation-research should reflect reality of intended audience		
	H. People "get tired" of eating cowpeas, lack of variety in methods of preparation		

Constraint	Problem	Geographic Area	Suggested Research Solutions
IX	A. Multiplicity of farming systems in diversity of local conditions		
	B. Lack of intermediate technology and appropriate equipment		
	C. Seed industry not well developed		
	D. Roads, education, institutions are inadequate		
	E. Labor requirements are not met, migration influence		
	F. Sociology of small farm family as part of farming system not understood		
	G. Women's role in farming system, unique - needs not identified		
	H. No land zonification		
	I. Extension inadequate, production/consumption information lacking		
	J. Place of legumes in farming system		
	K. Understanding seasonality in demographic features: population density, land pressures, labor availability, resource drain		
	L. Institutional address of problems should include establishment of a bean center (and selected zones outside the center) for testing yield and local adaptation.		

FARMING SYSTEMS AND SERVICES

EDUCATION, TRAINING AND RESEARCH CAPABILITY

Constraint	Problem	Geographic Area	Suggested Research Solutions
X	A. Stability or turnover of LDC and U.S. research personnel		
	B. Language capability of U.S. scientists		
	C. Trained LDC personnel insufficient in number		
	D. Inefficient or lack of screening procedures		
	E. Appropriate student training, motivate students		
	F. Scientists needed: breeders, physiologists, entomologists, economists, nutritionists, food technologists, pathologists		
	G. Technical support needed		
	H. Laboratory supplies and equipment needed		
	I. Continuing education of U.S. and LDC scientists		
	J. Transportation capability to field/research sites		
	K. Student strikes and some student distrust of U.S. field research		
	L. Migration of scientists		
	M. University research budget cuts		
	N. Low level of education among populace		

BEAN/COWPEA CRSP WORK DOCUMENT 2 (PRIORITIZATION)

Name_____ Representing Region_____

Please prioritize the overall constraint areas and the problems within each as you know them to exist in your region. Rank order each item, giving the number 1 to the most important. Do not repeat a number within the same column--you must resolve all "ties".

Constraint Area	Rank
I. Limitations of the Physical Environment	
II. Plant Pests and Diseases	
III. Plant Response Limitations	
IV. Farming Practices and Management	
V. Production/Consumption Economics	
VI. Storage and Commodity Maintenance	
VII. Nutrition, Food Preparation and Health	
VIII. Socio-cultural Factors	
IX. Farming Systems and Services	
X. Education, Training and Research Capability	

Constraint I. Limitations of the Phys. Environment

Problem	Rank
A. Problems of chemical or physical properties of soil	
B. Deteriorating land quality (erosion, compaction, etc.)	
C. Water inadequate or excessive, especially during most critical time and temperature	
D. Temperatures too high or too low	
E. Nitrogen fixation & phosphorous use efficiency	
F. Wide variations in soils, climates, elevations, environmental resources within a given country	
G. Molybdenum requirements	
H. Altitude effects	
I. Sources of firewood for cooking rapidly being depleted	
J. Inadequate or non-existent irrigation facilities	

Constraint II. Plant Pests & Diseases

Problem	Rank
A. Insects in soils	
B. Insects in seedlings	
C. Insects in foliage	
D. Insects - stem boring	
E. Insects - pod boring	
F. Animals or birds destroy crops	
G. Fungal diseases	
H. Bacterial diseases	
I. Viral diseases	
J. Nematodes	
K. Weeds inadequately controlled	
L. Insects have become resistant to insecticides	
M. General pests and disease problems	
N. Development of integrated pest management strategies: Chemical, biological, cultural, social	
O. Disease resistant screening techniques needed	
P. Relationship of pest damage to plant stages and zonal influences	
Q. Factors affecting infection, multiplication and distribution of disease organisms	

Constraint III. Plant Response Limitations

Problem	Rank
A. Low fertilizer response	
B. Yields strongly affected by wind and weather	
C. Low/non-nodulation at the farm level	
D. Other crops more productive	
E. Cultivars not adapted (daylength, temperature, etc.)	
F. Poor competitiveness in intercropping	
G. Inherent yield potential too low - especially in favored varieties	
H. Maturity, length of growth cycle	
I. Sensitivity to drought and/or cold	
J. Instability of performance	
K. Assemble and evaluate indigenous germ plasm collections - germ plasm exchange	
L. Physiological studies: plant efficiency, limitation of sinks, abscission, photo-respiration, etc.	
M. Poorly structured plant types characterized by: long vegetative phase preceding flowering and continuing through reproductive phase, large leaf area index, low ratio of seed to non-seed portions, self-shading, too viny and prostrate, plant architecture	
N. Nitrogen fixation problems including effects of high soil temperatures	
O. Sensitivity to lodging	
P. Water use efficiency	
Q. Plant nutrition & mineral efficiency In 232 bean fertilization trials in Brazil responses were noted in following frequencies: N - 67 times, P - 103, K - 15, lime - 31, micro-nutrients - 17	
R. Fertility trials and mineral toxicity	
S. Climatic zonal contribution to plant, rhizobial responses	

Constraint IV. Farming Practices & Management

Problem	Rank
A. Livestock waste used for other than fertilizer	
B. Low stand establishment	
C. Yield losses during growing season	
D. Harvest losses	
E. Seed quality (pathogens, saprophytes, physical)	
F. Farmers do not use modern measures to control diseases and pests	
G. Developed technologies are inappropriate	
H. Herbicide tolerance in mixed cropping systems	
I. Mixed cropping constraints and suitability	
J. Management (especially as it relates to small farms): tillage methods, rhizobial systems, timing, populations and spacial arrangements, utilization patterns	
K. Understanding of farmers reasons lacking	
L. Fertilizer practices inadequate or indiscriminate relative to zone	
M. Indiscriminate use of insecticides	
N. Criteria for choice of varieties	
O. Land preparation untimely and inadequate	
P. Hand harvesting	
Q. Constraints of monoculture	

Constraint V. Production/Consumption Economics

Problem	Rank
A. Economics of fertilizer availability -- use and response	
B. Land is not available	
C. Modern inputs are too costly	
D. Equipment not available or too costly	
E. Controlling insects is uneconomical	
F. Pesticides unavailable or can't afford them	
G. Risks are inherent in trying new technology	
H. New techniques not financially feasible	
I. Inadequate availability of credit and inadequate skill in use.	
J. Incentives lacking	
K. Farmers adapt modern technology to other crops but not to beans	
L. Farmers get only a small share of the retail market price	
M. Marketing	
N. Socio-political-economic systems limit the small farmer	
O. Small farmers have no political power - need cooperatives but not trusted	
P. Economics of nutrition	
Q. Assessment of governmental economic infrastructure: input supply, credit availability, extension support	
R. Risk aversion as small farmer motivator	
S. Large grower needs to include cultivars for mechanical harvesting and incentives.	
T. Inability to afford animal power	
U. Export markets within continent	
V. Economics of alternative production systems	
W. Other crops more profitable	
X. Economic analysis of various farming systems approaches	
Y. Impact of zone on costs of production	
Z. Economics of processing and commercialization both as seed and for human consumption	
AA. Determination of most suitable area for commercial production	
BB. Scarce and expensive energy resources	
CC. High labor costs	
DD. Economics of women's roles	

Constraint VI. Storage & Commodity Maintenance

Problem	Rank
A. Post-harvest losses	
B. Seeds become too hard when kept too long	
C. Maintenance of nutritive value in storage	
D. Appropriate "village" technology for storage responsive to unique conditions but frequently inadequate	
E. Diseased seed or pest infested	

Constraint VII. Nutrition, Food Preparation & Health

Problem	Rank
A. Home processing difficulties	
B. Beans cause problems as a food for young children	
C. Ease of cooking - takes too much fuel	
D. Low protein digestibility	
E. Low methionine or methionine availability	
F. Tannin content	
G. Gastro-intestinal or other disease limit human activity	
H. Grain nutritional quality & assessment on living organisms	
I. Antimetabolites & flatulence	
J. Heat treatment, toxicity & nutritive values	
K. Dietary habits inadequate - amino acid assessment	
L. Seed quality and size relative to yield and nutritive value	
M. Malnutrition & nutrition needs	
N. Scarce firewood for cooking	

Constraint VIII. Socio-cultural Factors

Problem	Rank
A. Beans are not a preferred crop/food	
B. Dietary habits of different ecological zones	
C. Cowpea texture - grittiness	
D. Color and size of seed not acceptable	
E. Flavor and texture are not acceptable	
F. Farmers aspire to occupations other than farming	
G. Importance of class in problems, resources, options and motivation-research should reflect reality of intended audience	
H. People "get tired" of eating cowpeas, lack of variety in methods of preparation	

Constraint IX. Farming Systems & Services

Problem	Rank
A. Multiplicity of farming systems in diversity of local conditions	
B. Lack of intermediate technology and appropriate equipment	
C. Seed industry not well developed	
D. Roads, education, institutions are inadequate	
E. Labor requirements are not met, migration influence	
F. Sociology of small farm family as part of farming system not understood	
G. Women's role in farming system, unique - needs not identified	
H. No land zonification	
I. Extension inadequate, production/consumption information lacking	
J. Place of legumes in farming system	
K. Understanding seasonality in demographic features: population density, land pressures, labor availability, resource drain	
L. Institutional address of problems should include establishment of a bean center (and selected zones outside the center) for testing yield and local adaptation.	

Constraint X. Education, Training & Research Capability

Problem	Rank
A. Stability or turnover of LDC and U.S. research personnel	
B. Language capability of U.S. scientists	
C. Trained LDC personnel insufficient in number	
D. Inefficient or lack of screening procedures	
E. Appropriate student training, motivate students	
F. Scientists needed: breeders, physiologists, entomologists, economists, nutritionists, food technologists, pathologists	
G. Technical support needed	
H. Laboratory supplies and equipment needed	
I. Continuing education of U.S. and LDC scientists	
J. Transportation capability to field/research sites	
K. Student strikes and some student distrust of U.S. field research	
L. Migration of scientists	
M. University research budget cuts	
N. Low level of education among populace	

BEAN/COWPEA CRSP WORK DOCUMENT 3 (COUNTRIES)

Name_____ Representing Region_____

The following countries have expressed an interest in early involvement in bean/cowpea research activity. Initially we anticipate research will be funded for the first round in a maximum of three countries per region. Based on your understanding of the bean/cowpea research needs, interests and capabilities in your region please recommend three countries from your own region which you feel would be the most appropriate for the initial work. Please indicate the appropriate commodity for each country (beans, cowpeas or beans/cowpeas). In each case give the reasons for your country choice.

East Africa	West Africa	Caribbean
Kenya	Nigeria	Jamaica
Tanzania	Cameroon	Trinidad
Malawi	Niger	Guyana
Zambia	Upper Volta	Dominican Republic
	Ghana	

Meso-America	South America
Mexico	Brazil
Guatemala	Colombia
Costa Rica	Ecuador
Honduras	Chile

Countries Recommended	Commodity	Reasons for Choice
1.		
2.		
3.		

BEAN/COWPEA CRSP WORK DOCUMENT 4 (RESEARCH DESIGN)*

Name_____ Representing Region_____

Below are the countries you have recommended for initial bean/cowpea research activity in your region. Also indicated are the top constraint areas with their problems according to your recommendation. Assuming a maximum of three research programs in any one country, match the constraint problems to the country.*

Country & Commodity: _____ _____ _____

Constraint/Problems:

_____ _____

_____

_____

_____ _____

_____

_____

_____ _____

_____

_____

Country	Recommended Research Problems
_____	1. _____
	2. _____
	3. _____
_____	1. _____
	2. _____
	3. _____
_____	1. _____
	2. _____
	3. _____

*Where you think research problems should be combined in one interrelated research design, indicate by referencing all problems. For example, next to a given country you could indicate research on item IA should include VC and IXA. Thus under the Research column, for that country you would write IA-VC, IXA.

B/C CRSP WORK DOCUMENT 5 (PROPOSAL MATCH)

Name_____ Representing Region_____

Please review Planning Document B (U.S. Research Responses), Planning Document C (U.S. Researcher Institutional Affiliation and Proposal Peer Panel Ranking), and your Work Document 4. Find the proposal topic that most nearly represents the research needed for the research problems you indicated in Work Document 4. Fill this information in below. Keep in mind that all the proposals are preliminary, will need much modification, and are mostly to be taken as the Principal Investigator's area of expertise. Should no proposal topic appear to fit a research problem recommended, indicate your recommendations for a subsequent request for additional proposals.

Country / Problems from WD4	Research Proposal Match
_____	
_____	_____
_____	_____
_____	_____
_____	
_____	_____
_____	_____
_____	_____
_____	
_____	_____
_____	_____
_____	_____

BEAN/COWPEA CRSP WORK DOCUMENT 6

Please review Planning Document D (Criteria for inclusion of U.S. Institutions in CRSP and consideration of 3 levels of funding) and your responses on Work Document 5. In the space below, give your response to Planning Document D and your ideas as to the U.S. institutions that should be involved in the overall CRSP plan.

A P P E N D I X E

EXAMPLES OF RETURNED COUNTRY RESEARCH RESPONSE SHEETS

and

CORRESPONDENCE

from

HOST COUNTRIES

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4th February, 1980

Dr. Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program
Dept. of Crop and Soil Sciences
Michigan State University
East Lansing
MICHIGAN 48824

Dear Dr. Pat Barnes-McConnell,

Thank you for your letter of January 2, 1980 that I received on January 21, 1980. It is a pleasure to receive detailed write up on the short CRSP meeting we held at Michigan State University late last year.

I have looked through the report on Eastern African and in particular, Kenya, and the listing of the priorities are as the group discussed. I have further looked through the Evaluation sheet, and I find that, a number of research topics could be combined to be of first priority i.e. pre and post-harvest Crop Protection, as of being of great importance in the tropics.

I note that a meeting is scheduled in March in Malawi and we will send Drs. Mukunya, Gathuru and Muruli to represent the Faculty. I hope funds to support their participation will be forth coming. I hope to meet with your team when you visit Eastern Africa and discuss further the collaboration needed between this faculty and Michigan State University in this program.

Thank you for the nice reception we had at Michigan State University and I do apologise for delay in writing due to Christmas committments and some other personal involvement in the U.N. agencies immediately I returned from Michigan State University.

Best regards to all.

Yours sincerely,

C.N. Karue
Dean

c.c. Dr. Adams.

From: Kame

LDC Collaborators Evaluation Sheet of Country Research Areas*

COUNTRY: KENYA (BEANS/COWPEAS)

TOPIC: The development of integrated crop protection strategies addressing pre- and post-harvest needs in a labor intensive, mixed cropping system with wide environmental variations.

RESEARCH ITEMS	Rank	Name(s) of LDC Research Collaborator(s)	Type of U.S. Researchers Needed
1. Development of practices and/or of genetic resistance to protect against stem borers in beans.	1	Dr. Mukunya	Pathologist
2. Incorporation of generalized and specific disease resistance into preferred seed types in dry beans.	1	Dr. Gathuru	Virologist
3. Coordinate with (not duplicate) the work of the Wageningen (Netherlands) team at Thika, working on virus resistance and germ plasm classification.	5		
4. Analysis of biological, varietal and physical factors of the environment affecting plant performance, particularly as reflected in flower and pod abscission.	2	Dr. Pathak	Breeder
5. Development of genetic resistance to environmental limitations (drought, temperature extremes, low fertility).	2	Dr. Muruli	Breeder
6. Analysis of traditional pest and disease control farming practices and their relationship to variations in the physical environment.	1	Dr. Mukunya	Pathologist
7. Work on the symbiotic interactions of plant responses in mixed cropping-- plant, nutritional and protective aspects.	4		
8. Examination and analysis of present processing and storage methods.	3	Mrs. I. Gomez Mr. E. Kururi	Food Engineer Expert
9. Development of processing and storage methods and/or varieties that overcome the hardseed problem, and hence reduce cooking time and the need for fuel.	3	Food Science and Technology Dept.	"
10. Research on the insect problems of cowpeas, both in production and in storage.	1	Dr. Gathuru	Entomologist
11.			

Name of person completing this form _____ Discipline Agriculture Address P.O. Box 29053
Nairobi
Kabete

Name(s) of person(s) reviewing this form after completion: _____

*Make comments on reverse side.

Research Item No.	Comments
1.	Research topics for 1 , 2, 6 and 10 should be combined as one integrated project on crop protection.
2.	
3.	Collaboration has continued at advisory level with Thika programme and is expected to continue.
4.	
5.	
6.	
7.	So far, the mixed crop specialist we had has gone and coordination on this is not possible now.
8.	
9.	
10.	
11.	

LDC Collaborators Evaluation Sheet of Country Research Areas*

COUNTRY: KENYA (BEANS/COWPEAS)

TOPIC: The development of integrated crop protection strategies addressing pre- and post-harvest needs in a labor intensive, mixed cropping system with wide environmental variations.

RESEARCH ITEMS	Rank	Name(s) of LDC Research Collaborator(s)	Type of U.S. Researchers Needed
1. Development of practices and/or of genetic resistance to protect against stem borers in beans.	9	DR. B.I. MURULI	PLANT BREEDER
2. Incorporation of generalized and specific disease resistance into preferred seed types in dry beans.	4	DR. S.O. KEYA	SOIL SCIENTIST
3. Coordinate with (not duplicate) the work of the Wageningen (Netherlands) team at Thika, working on virus resistance and germ plasm classification.	10	DR. D. M. MUKUNYA	ENTOMOLOGIST/ NEMATOLOGIST
4. Analysis of biological, varietal and physical factors of the environment affecting plant performance, particularly as reflected in flower and pod abscission.	1		PHYSIOLOGIST
5. Development of genetic resistance to environmental limitations (drought, temperature extremes, low fertility).	6		
6. Analysis of traditional pest and disease control farming practices and their relationship to variations in the physical environment.	2		
7. Work on the symbiotic interactions of plant responses in mixed cropping-- plant, nutritional and protective aspects.	5		
8. Examination and analysis of present processing and storage methods.	8		
9. Development of processing and storage methods and/or varieties that overcome the hardseed problem, and hence reduce cooking time and the need for fuel.	7		
10. Research on the insect problems of cowpeas, both in production and in storage.	3		
11.			

Name of person completing this form Bartholomew I. Muruli Discipline Crop/Physiologist/Nutritionist Address Crop Science, University of Nairobi, P. O. Box 30197, Nairobi, Kenya.

Name(s) of person(s) reviewing this form after completion: Dr. S. O. Keya, Chairman, Department of Soil Science, University of Nairobi, Box 30197, NAIROBI, Kenya.

*Make comments on reverse side.

Research Item No.	Comments
1.	Adaptation of cultivars to the environment, high yielding types. Little is known about these factors, especially in relation to leaf picking and seed yield.
2.	Pests and diseases are the major problems in cowpeas.
3.	Same as for (2) above.
4.	Varieties resistant to pests ought to be tailored for various ecological zones.
5.	Cowpeas easily find their rhizobia in the soil. However it is vital that cowpeas should fix adequate nitrogen at least for themselves.
6.	Low fertility, drought, temp. moisture stress, are major limiting factors to production.
7.	Traditional storage methods are lagging behind current production and technology trials.
8.	Same as (7) above
9.	Stem borer is not of high priority in cowpeas.
10.	Adequate competence exist at the University of Nairobi. At a joint meeting with the Ministry of Agriculture, at least for Kenya, it had been agreed that Thika people better concentrate on beans and the University of Nairobi concentrates on cowpeas and pigion peas.
11.	

UNIVERSITY OF DAR ES SALAAM
FACULTY OF AGRICULTURE AND FORESTRY
P. O. Box 643 — MOROGORO — TANZANIA

Telephone No. 2511

Telegrams : "UNIAGRIC"
MOROGORO

Our Ref. :

Your Ref. : CS/R/58

8th February, 1980.

Dr. Pat Barnes-McConnell,
Assistant Coordinator,
Bean/Cowpea Planning Programme,
Michigan State University,
Department of Crop and Soil Sciences,
Soil Science Building,
East Lansing,
MICHIGAN,
U.S.A.

Dear Dr. Barnes-McConnell,

It was indeed very kind of you to write about the proposed Bean Programme. We have discussed it at the Departmental level and we will be very pleased to participate in the programme. I gathered from Dr. Paul Duffield that you willbe going to the Malawi Bean Workshop. I will be going there as well - we are presenting a Country Report at the Workshop.

Enclosed please find theform duly completed. I am looking forward to meeting you again.

Yours sincerely,

Bruno J. Ndunguru
Head, Crop Science Department

Encl.:1

LDC Collaborators Evaluation Sheet of Country Research Areas*

COUNTRY: TANZANIA (BEANS)

TOPIC: Zone related germ plasm evaluations with attention to adaptability, pests, and disease resistance, plant performance in intercropped patterns and consumer acceptance characteristics (size, color, taste, cooking time, toxicity and nutritional value).

RESEARCH ITEMS	Rank	Name(s) of LDC Research Collaborator (s)	Type of U.S. Researchers Needed
1. Evaluation based on land races collected from different ecological zones in the country.	1	MBUNGURU LOTO TERI KAREL	
2. Assessment of pest and disease resistance to isolate lines for a breeding program.	3	DR LOTO DR. KAREL DR. TERI	ENTOMOLOGIST/PATHOLOGIST
3. Assessment of drought resistance and other performance characteristics, including yield and cooking quality, particularly in those land races more highly favored by subsistence farmers.	2	DR. LOTO DR. MBUNGURU	DROUGHT AGRONOMIST
4. Analysis of consumer preference for size, color, taste and the traditions associated with identified varieties (e.g., varieties eaten by pregnant women, those used for weaning food, etc.)	4	MPHURU MBUNGURU	
5. Evaluation of nutritional quality, toxicity and other health factors in identified varieties, including gastrointestinal complaints in adults and children.	5	BANGU N	CHILD HEALTH NUTRITIONIST
6. Evaluation of traditional processing methods of identified varieties for energy use, resultant nutritional quality and toxicity.	6	MTEBE K	FOOD TECHNOLOGIST
7. Survey of all traditional uses of all parts of the favored varieties (stems, leaves, etc.) and their contribution to the survival of the farm family.	7	MPHURU MBUNGURU	
8.			

Name of person completing this form DR BEANS J MBUNGURU Discipline CROP PHYSIOLOGIST Address UNIVERSITY OF DAR ES SALAAM DEPT OF CROP SCIENCE P.O. BOX 643 MOROGORO TANZANIA

Name(s) of person(s) reviewing this form after completion: DRS DOTO, KAREL, TERI and MR MPHURU

*Make comments on reverse side. NONE ON REVERSE SIDE.

LDC Collaborators Evaluation Sheet of Country Research*

COUNTRY: MALAWI (BEANS)

TOPIC: The contribution of culture, the physical environment, agronomic practices and plant genetics in the evolution and maintenance of naturalized bean land-races.

Research Items	Rank	Name(s) of LDC research Collaborator(s)	Type of U.S. Researchers Needed
1. Determine the basis and the utility of typical land race diversity in the region.	6	C. T. Edje	
2. Identify the biological, physical and cultural forces accounting for the present patterns of diversity.	2	and	
3. Establish the plant and cultural characteristics essential to acceptance by subsistence farmers.	1	D. Greenberg	
4. Determine the role of women in production of beans, seed selection, and group acceptance of particular types for specific uses.	3	and	
5. Determine the desire for and the definition of "improved" cultivars in a complex social system characterized by many different bean identified village groups.	4	Dr. Rao	
6. Derive principles to serve as guidelines to the successful introduction of an improved cultivar.	5		
7.			

Name of person completing this form C. T. Edje Discipline Agronomist Address Bunda College

Name(s) of person(s) reviewing this form after completion: _____

*Make comments on reverse side.

A P P E N D I X F

SUMMARY OF CONSTRAINT PRIORITIES

and

PRIORITY RANKINGS WITHIN CONSTRAINT AREAS

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SUMMARY OF CONSTRAINT AREA PRIORITIZATION

Table 1.

Constraint Areas	C da Silva-Dias Brasil - South America (B/C)	Peter Goldsworthy I.I.T.A. - Global (C)	T. Ferguson Caribbean Zone (B/C)	C. N. Karue Kenya - East Africa (B/C)	E. Mmbaga Tanzania - East Africa (B)	A. M. Pinchinat, IICA Meso-America (B)	P. Graham C.I.A.T. - Global (B)	C. Wien West Africa (C)	Average of 8	D. H. Wallace - Plan. Off.	M. W. Adams - Plan. Off.	P. W. Barnes-McConnell - Plan. Off.	J. Yohe AID - Washington
Limitations of Physical Environment	3	4	4	9	4	4	4	4	4.5	3	5	8	10
Plant Pests & Diseases	1	1	2	1*	2	2	1	1	1.4	2	1	4	1
Plant Response Limitations	4	2	1	2	3	3	2	8	3.1	4	2	3	2
Farming Practices and Management	6	5	3	7	9	1	5	5	5.1	10	4	1	4
Production/Consumption Economics	7	6	6	4	7	6	7	7	6.2	9	6	2	7
Storage and Commodity Maintenance	2	8	7	3	6	5	6	3	5.1	7	7	7	5
Nutrition, Food Preparation and Health	9	9	8	6	8	7	3	10	8.1	8	9	5	3
Socio-cultural Factors	10	10	10	8	5	8	10	9	8.8	6	8	6	8
Farming Systems & Services	8	7	9	5	10	9	9	6	7.9	5	10	9	6
Education, Training & Research Capability	5	3	5	1*	1	10	3	2	3.8	1	3	10	9**

*Dean Karue, overlooking the fact that we had agreed before scoring the constraint area that education and training should be a part of all projects, wished to emphasize that two areas should receive highest priority.

**Dr. Yohe provided two sets of scores; the scores listed here reflect his understanding that education and training would be integrated into all projects, and therefore did not really need a high score.

PRIORITIES WITHIN SELECTED CONSTRAINT AREAS

Plant Pests & Diseases	G. da Silva-Dias Brasil - South America		Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams		P. W. Barnes-McConnell	J. Yohe AID - Washington
	B	C									B	C		
A. Insects in soils	7	9	16	9	15	11	7	12			11	13	12	
B. Insects in seedlings	8	10	15	8	14	1	9	3	5		8	9	13	
C. Insects in foliage	3	2	3	6	13	17	4	4	7	1	4	4	14	1
D. Insects - stem boring	9	7	1	7	11	16	-	9	6		9	11	6	
E. Insects - pod boring	10	8	2	2	12	4	5	8	1		10	12	7	
F. Animals or birds destroy crops	14	14			16	15	-	13	13				17	
G. Fungal diseases	4	5	6	3	1	2	3	1	7		1	6	8	
H. Bacterial diseases	2	3	7	5	3	5	2	4	8	2	2	5	9	2
I. Viral diseases	1	1	5	4	4	3	1	2	2		3	7	10	
J. Nematodes	5	4	14	11	2	12	8	7	10	4	7	10	15	
K. Weeds inadequately controlled	11	11	13	10	10	8	10	11	3	3	5	8	11	3
L. Insects have become resistant to insecticides	12	12	12	16	17	14	-	15	14				16	8
M. General pest & disease problems	13	13	11	1	5	6	11		15		6	3	1	9
N. Development of integrated pest management strategies: Chemical, biological, cultural, social			10	12	6	7	6	5	4			1	2	7
O. Disease resistant screening techniques needed	6	6	8	13	7	9	13	10	9			14	5	4
P. Relationship of pest damage to plant stages & zonal influences	8	8	4	14	8	13	12	14	12			15	3	5
Q. Factors affecting infection, multiplication and distribution of disease organisms	7	7	9	15	9	10	14	6	11			2	4	6

Discussion and Interpretation

It is clear that the region represented by the individual scorer and whether the individual scorer had a primary concern for beans or cowpeas play predominant roles in his assigning priorities to the various problems listed.

From that perspective, it may be concluded that insects in cowpeas, and diseases in beans constitute major problems in these two crops, respectively. Moreover, it appears that diseases in cowpeas and insects in beans would rank as second priorities in each crop. Nematodes and weeds follow as of third priority.

The last four items listed, commencing with need for integrated pest management, are more in the nature of solutions than of problems, and the rankings given these subjects reflect the primary concerns with insects and diseases.

Clearly, then, in the final CRSP, support should be given to research proposals designed to alleviate these fundamental pest-disease problems in both crops. Consideration in selecting and assigning proposals will have to be given to area and to the possible impact of a new CRSP on Crop Protection currently in the planning stage.

Plant Response Limitations	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell J. Yohe AID - Washington
A. Low fertilizer response	4	15	9	5	2	-	13	18	5	10	17	5
B. Yields strongly affected by wind and weather	15	18	7	17	19	-	11	8	2	15	19	10
C. Low/non-nodulation on farms	7	17	11	4	8	-	4	17		7	18	4
D. Other crops more productive	6	16	14	13	13	-	12	9		14	16	
E. Cultivars not adapted (daylength, temperature, etc.)	10	6	4	14	12	9	2,1	3		8	15	1
F. Poor competitiveness in intercropping	5	12	18	11	7	-	9	16		16	1	3
G. Inherent yield potential too low - especially in favored varieties	2	8	1	12	1	8	1,2	2		1	4	2
H. Maturity, lenths of growth cycle	9	9	19	7	18	11	7	10		13	11	8
I. Sensitivity to drought and/or cold	3	10	6	8	6	10	5	11	3	6	12	7
J. Instability of performance	6	4	5	16	9	5	8	19		12	3	1
K. Assemble and evaluate indigenous germ plasm collections - germ plasm exchange	-	1	3	9	16	6	10	15	1	4	2	-
L. Physiological studies: plant efficiency, limitation of sinks, abscission, photo-respiration, etc.	-	11	2	10	15	1	2	6	1-4	3	10	6
M. Poorly structured plant types such as: long vegetative phase preceding flowering & continuing through reproductive phase, large leaf area index, low ratio of seed to non-seed portions, self-shading, too viny & prostrate, plant architecture	1	2	17	18	14	2	1	4		2	9	9
N. Nitrogen fixation problems including effects of high soil temperatures	8	3	10	1	10	13	4	7	4	5	6	4
O. Sensitivity to lodging	14	19	16		5	12	6	13	1	11	13	-
P. Water use efficiency	13	5	15	2	4	7	-	12	3	9	14	-
Q. Plant nutrition & mineral use efficiency	11	13	8	3	17	3	3	1	5	17	7	5
R. Fertility trials & mineral toxicity	-	14	12	6	11	4	3	5	5	18	8	5
S. Climatic zonal contribution to plant, rhizobial responses	12	7	13	15	3	-	14	14	5	19	5	-

Discussion and Interpretation

This constraint category refers to inherent limitations in the plants' ability to deal with environmental and biological stresses, and to produce high yields of grain under a diversity of conditions between and within countries and farming systems.

The responses of the panel, as might be expected, given individual backgrounds and the sometimes overlapping nature of the problems, appear quite variable.

Most panelists scored "inherent yield potential too low" as of high priority. Poorly structured plant types, and physiological impairments including sensitivity to drought or temperature, inefficienct utilization of nutrients, water, and inadequate nitrogen fixation relationships appear to be seen by the panelists as probable causes of low yield potential. These factors would lead to instability of performance or poor adaptation, which some panelists saw as of high priority. Among possible solutions, most of which were not expressly listed in this category, was one which was listed as "assemble and evaluate indigenous germ plasm"; this item was scored intermediate to high, and is one which would follow naturally in any campaign against "low yield potential".

Items such as "yields strongly affected by wind and weather", "climatic zonal contribution to plant, rhizobial responses", and "other crops more productive", quoted more or less verbatim from the cited Documentation, were apparently perceived as too general, or perhaps too redundant as compared with certain other items more specifically stated, to be ranked very high.

Limitations of the Physical Environment	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A. Problems of chemical or physical properties of soil	4	4	4	5	3	1	1	2	4	4	3	4
B. Deteriorating land quality (erosion, compaction, etc.)	5	5	5	3	5	2	4	1	3	9	2	5
C. Water inadequate or excessive, especially during most critical time and temperature	2	1	3	2	1	4	3	3	1	2	1	3
D. Temperatures too high or too low	6	6	2	10	7	-	6	5	2	5	6	6
E. Nitrogen fixation & phosphorous use efficiency	1	2	6	1	6	5	2	4	3	1	5	2
F. Wide variations in soils, climates, elevations, environmental resources within a given country	3	3	1	6	4	3	7	8	7	3	4	1
G. Molybdenum requirements	9	10	10	9	8	7	5	9	6	10	9	7
H. Altitude effects	10	7	8	7	9	-	8	10		8	8	8
I. Sources of firewood for cooking rapidly being depleted	8	8	9	8	10	8	9	7	5	6	7	9
J. Inadequate or non-existent irrigation facilities	7	9	7	4	2	6	10	6	8	7	10	10

Discussion and Interpretation

It was recognized, in this constraint area, as in several of the others, that some of the items listed as problems simply are not researchable items. For example, firewood resources are becoming scarce, but it isn't the function of this CRSP to develop alternate fuels for cooking. It conceivably could become a CRSP function to develop processes that tend to be fuel efficient, or cultivars that required less cooking time. Similarly, from a direct research standpoint little can be done to change "altitude", but the effects of low temperatures might be mitigated in some way. We must, in interpreting panelist responses in these areas, be aware that a particular problem is not necessarily a less severe constraint just because it is perceived as not researchable and given a low priority (high number) accordingly.

On balance, it appears that the problems of inadequate or excessive amounts of water, and of nitrogen-fixation and phosphorous-use efficiency by beans or cowpeas are judged by the panelists to be most severe. "Chemical and physical properties of soils" and "wide variations in soils and climates" each received moderately high priority. These items are, however, quite general, and both can be regarded as more general cases of the specific problems exemplified by the items of water, nitrogen fixation, and phosphorous use efficiency, all of which scored higher in priority.

Deteriorating quality of land is clearly of concern, not the highest nor yet the lowest in ranking among the ten items listed. As a subject for research support, this problem lies perhaps more in the area of farming practices or management.

It may be concluded that research support in this constraint area should be directed toward the plant-soil interface and in crop, water, and soil management.

Farming Practices & Management	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A. Livestock waste used or other than fertilizer	16	14	17	16	12	-	14	17		17	10	15
B. Low stand establishment	4	13	4	15	1	8	4	14		16	12	2
C. Yield losses during growing season	3	6	1	4	16	-	1			2	13	1
D. Harvest losses	2	7	2	3	15	10	5	3		11	14	4
E. Seed quality (pahtogens, saprophytes, physical)	1	12	3	-	7	5	3	4	2	10	4	3
F. Farmers do not use modern measures to control diseases and pests	7	2	10	6	2	-	10	5		3	16	14
G. Developed technologies are inappropriate	13	8	6	5	8	2	9	11	3	8	5	7
H. Herbicide tolerance in mixed cropping systems	12	17	12	7	11	4	13	6		9	7	8
I. Mixed cropping constraints and suitability	9	3	13	1	3	3	2	10		13	2	5
J. Management (especially as it relates to small farms): tillage methods, rhizobial systems, timing, populations and spacial arrangements, utilization patterns	6	1	5	2	4	1	1	2		1	3	6
K. Understanding of farmers' reasons lacking		4	9	14	10	9	6	7	1	12	1	11
L. Fertilizer practices inadequate or indiscriminate relative to zone	8	11	8	8	9	6	8	12		4	8	10
M. Indiscriminate use of insecticides	15	16	11	13	5	-	11	15		6	9	13
N. Criteria for choice of varieties	10	5	7	9	6	-	7	8		7	6	12
O. Land preparation untimely and inadequate	11	9	14	12	13	7	(J)	9		5	11	9
P. Hand harvesting	5	15	15	10	14	-	12	13		15	15	16
Q. Constraints of monoculture	14	10	16	11	-	-		16		14	17	7

General

Discussion and Interpretation

The inclusive generality of certain items and the very singular specific nature of other items in this list led to much heterogeneity in patterns of response by different panelists.

The problem of management seemed to most panel members as major, in this constraint area. But we could include in this problem the item listed as "farmers don't use modern methods of insect and disease control" which elicited high priority from some panel members. "Yield losses during the growing season" could mean several things: insect damage; disease damage; infertility; drought effects; blossom and pod abscission; lodging; etc. Nevertheless, as a general category of more specific problems, this item drew relatively high priority. Seed quality was a third item of a somewhat more specific nature than the first two, which drew moderately high priority scores.

Harvest losses and constraints caused by mixed cropping followed as being of intermediate concern. These also are somewhat more specific than the category "management", but may be seen as special aspects of management. None of the other problems in this constraint category were deemed very severe.

It seems prudent, then, to conclude that, in this category, aspects of crop management, and factors affecting yield losses during the growing season should receive research support, to the extent that the category itself has priority. It should be noted that among factors affecting yield losses during the growing season are such things as, for example, insects and diseases, which have already been designated as of top priority.

Storage & Commodity Maintenance	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A. Post-harvest losses	5	1	1	1	1	1	1	2	1	3	4	3
B. Seeds become too hard when kept too long	2	4	3	4	5	2	2	4	2	1	1	2
C. Maintenance of nutritive value in storage	3	5	4	3	4	4	4	5	-	4	2	5
D. Appropriate "village" technology for storage responsive to unique conditions but frequently inadequate	4	3	5	2	3	5	5	3	3	5	5	4
E. Diseased seed or pest infested	1	2	2	5	2	3	3	1	(1)	2	3	1

Discussion and Interpretation

Post-harvest losses clearly commands top priority in this constraint area, and diseased or pest infested seed, the most important aspect of post harvest losses, is of second priority. Hard seededness in stored seeds is recognized as a major problem only by those panelists representing regions where beans are the major grain legume.

Production-Consumption Economics	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mubaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A. Economics of fertilizer availability--use & response	15	4	18	6	24	9	1	6		15	6	10
B. Land is not available	16	26	19	5	29	-	23	20		28	30	-
C. Modern inputs are too costly	12	8	8	7	1	-	6	11		14	2	11
D. Equipment not available or too costly	11	9	9	8	2	-	(6)	7		22	19	12
E. Controlling insects is uneconomical	9	2	15	9	30	-	8	8		16	29	13
F. Pesticides unavailable or can't afford them.	10	1	16	11	3	-	(6)	9		3	20	14
G. Risks are inherent in trying new technology	1	15	10	12	28	-	22	10		2	7	4
H. New techniques not financially feasible	5	16	4	20	7	-	21	5		1	25	6
I. Inadequate availability of credit and inadequate skill in use.	6	10	25	2	25	10	2	2		4	3	5
J. Incentives lacking	29	17	24	3	24	11	20	24		17	1	4
K. Farmers adapt modern technology to other crops but not to beans.	13	25	27	28	4	12	19	23		5	17	15
L. Farmers get only a small share of the retail market price.	3	11	26	13	20	-	18	12		6	18	22
M. Marketing	4	14	5	1	11	5	3	13		23	27	3
N. Socio-political-economic systems limit the small farmer.	2	12	7	14	12	6	15	4	3	7	13	7
O. Small farmers have no political power - need cooperatives but not trusted	7	13	23	25	21	-	17	3		8	21	21
P. Economics of nutrition	28	24	22	1	26	-	16	25		24	4	20
Q. Assessment of governmental economic infrastructure: input supply, credit availability, extension support	19	7	-	24	13	3	4	1		30	8	8
R. Risk aversion as small farmer motivator	17	3	21	23	22	13	5	21	2	27	16	9
S. Large grower needs to include cultivars for mechanical harvesting & incentives.	18	28	6	27	23	4	19	29		25	24	19
T. Inability to afford animal power	8		29	26	19	-	9	14		29	9	12
U. Export markets within continent	27	18	28	16	18	-	15	30		20	28	-
V. Economics of alternative production systems.	26	19	1	15	17	1	14	15	4	21	12	1
W. Other crops more profitable.	14	20	2	17	5	-	12	17		9	15	18
X. Economic analysis of various farming systems approaches	25	5	14	18	15	2	7	16	1	10	11	2
Y. Impact of zone on costs of production	24	21	20	19	10	-	24	26		26	14	13
Z. Economics of processing & commerciali- both as seed & for human consumption	20	22	3	10	9	7	11	28		18	26	14
AA. Determination of most suitable area for commercial production	23	6	11	21	8	-	26	22		19	23	15
BB. Scarce & expensive energy resources	21	23	12	22	6	8	25	18		11	10	10
CC. High labor costs	22	27	13	4	14	-	10	19		12	22	16
DD. Economics of women's roles	-	29	17	29	16	14	13	27		13	5	17

Discussion and Interpretation

With a total of 30 problems listed in this constraint category, and given the lack, in the panel, of strength in the field of economics, we should not have expected a clear consensus on the gravity of particular problems. A consensus has emerged, however, as regards certain issues; these are the issues of costs and risks, the issue of marketing and return, and the issue of economic analysis of alternative farming systems.

These issues boil down to a major concern about investing money in a technology that may or may not pay off, the risks involved, the benefits that might accrue from other technologies or systems, and whether or not a particular technology or system will be accepted, will pay its costs; this hinges upon the marketing process and how much of the retail selling price the farmer receives.

For the technological side of the CRSP, the implication is that new technologies must not be expensive, they must require a minimum of prior investment of money, they must carry a high probability of favorable results if adopted, and, if possible, they must have a positive impact upon the marketing process. An example might be a simple inexpensive technological change that made it possible to overcome the hard seed problem in stored beans; or an inexpensive means of protecting cowpea seeds from ravages of stored insect pests.

Farming Systems and Services	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A. Multiplicity of farming systems in diversity of local conditions	1	2	1	1	9	2	2	3	2	11	1	2
B. Lack of intermediate technology and appropriate equipment	2	1	3	9	8	1	5	4	3	1	5	3
C. Seed industry not well developed	4	5	2	8	7	-	6	5	4	4	12	6
D. Roads, education, institutions are inadequate	3	7	4	10	6	-	8	2	-	10	10	7
E. Labor requirements are not met, migration influence	11	8	9	7	11	-	7	7	-	7	8	11
F. Sociology of small farm family as part of farming system not understood	5	3	5	6	5	3	3	6	1	5	2	4
G. Women's role in farming system, unique needs not identified	6	11	10	11	10	4	9	11	5	3	3	8
H. No land zonification	8	10	6	12	12	-	10	12	-	12	9	12
I. Extension inadequate, production/consumption information lacking	7	4	8	5	2	5	4	1	-	2	6	9
J. Place of legumes in farming system	10	9	7	2	3	-	1	10	-	8	7	5
K. Understanding seasonality in demographic features: population density, land pressures, labor availability, resource drain	9	6	11	3	4	-	11	8	-	9	4	10
L. Institutional address of problems should include establishment of a bean center (and selected zones outside the center) for testing yield and local adaptation.	-	12	12	4	1	-	12	9	-	6	11	1

Discussion and Interpretation

Most panelists saw the "multiplicity of farming systems within a deversity of local conditions" as a serious constraint. This was followed by a general "lack of intermediate technology and appropriate equipment". Development of some organized seed industry fell in an intermediate level of priority, as did the recognition that too little is known of the socio-cultural aspects associated with the small family farmer. The inadequacy of extension was recognized as of fifth highest priority, and supports, though not strongly, the oft-repeated reports of the Bean/Cowpea CRSP Travel Teams on this matter.

None of the other problems in this category rated serious concern by the panel.

It should also be noted that as a general constraint category this one was not rated of high priority. However, it must be acknowledged that some of the panelists felt that the titles of this category (Farming Systems and Services) and of "Farming Practices and Management" were so similar as to imply that the listed problems belonged in a single category. A re-evaluation of the two sets of problems indicates to me (M.W.A.) that, while the titles may appear to overlap, the problem arrays are quite distinct.

Nutrition, Food Preparation & Health	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A. Home processing difficulties	1	3	9	1	11	-	3	3		8	6	6
B. Beans cause problems as a food for young children	6	12	11	10	5	-	9	9		4	2	5
C. East of cooking - takes too much fuel	2	2	1	11	4	2	2	2	1	1	3	9
D. Low protein digestibility	7	6	7	9	1	3	1	10		2	12	1
E. Low methionine or methionine availability	8	5	2	3	2	4	7	4		3	11	4
F. Tannin content	9	-	8	12	3	1	8	5		7	14	2
G. Gastro-intestinal or other diseases limit human activity	10		13	13	12	-	10	6	2	11	10	-
H. Grain nutritional quality & assessment on living organisms	11	4	3	2	9	5	11	8		10	8	3
I. Antimetabolities & flatulence	12	7	4	6	13	6	12	11		12	5	4
J. Heat treatment, toxicity & nutritive values	13	8	12	5	14	7	6	12		9	4	4
K. Dietary habits inadequate - amino acid assessment	14	9	14	8	10	-	5	7		5	7	7
L. Seed quality and size relative to yield and nutritive value	3	1	5	7	7	-	13	13		6	9	10
M. Malnutrition & nutrition needs	5	10	6	4	6	-	4	1	3	13	1	8
N. Scarce firewood for cooking	4	11	10	14	8	-	(3)		4		13	11

Discussion and Interpretation

Two principal problems were identified in this category. One has to do with the length of cooking time required and the consequent amount of fuel consumed. This, of course, can be correlated with one of the problems cited in the storage category--that of hard seed development, particularly in beans. These comprise particular aspects of the more vaguely stated problem of "home processing difficulties" which also ranked relatively high in priority.

The other problem area has long been acknowledged--that of sulfur amino-acid deficiency and low protein digestibility.

Overall, this constraint category was not perceived as highly important. The two problem areas noted, however, are important, and if possible should be supported in the CRSP.

Socio-cultural Factors	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mmbaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A. Beans are not a preferred crop/food	6	5	6	5	8	-	5	8		5	8	5
B. Dietary habits of different ecological zones	1	4	3	4	4	-	6	4		4	7	3
C. Cowpea texture - grittiness	4	3	5	1	1 (B)	2	4	5		6	5	6
D. Color and size of seed not acceptable	2	1	2	2	3 (C)	-	1	1		3	4	2
E. Flavor and texture are not acceptable	3	2	4	3	2	1	2	2		2	3	1
F. Farmers aspire to occupations other than farming	8	8	1	6	7	-	8	3		8	2	8
G. Importance of class in problems, resources, options and motivation--research should reflect reality of intended audience	7	6	8	7	6	-	3	6		1	1	7
H. People "get tired" of eating cowpeas, lack of variety in methods of preparation.	5	7	7	8	5	3	7	7		7	6	4

Discussion and Interpretation

The priority assessments of problems in this constraint category were fairly clear across all panelists. Problems of flavor, texture, color and size of seed appeared to be of greatest concern. This is to be judged in a relative context--relative, that is, to the other problems in the category with which these are being evaluated by each panelist. And the items listed did not represent a full scope of problems that could have come in under the rubric of socio-cultural factors.

The two aspects of concern were (1) preferences regarding flavor, texture, color and size have to be determined, and (2) the results have to be incorporated in the breeding objectives of certain programs, and/or in the research design of any home processing research undertaken. In this regard, the overwhelming preponderance of production oriented persons on the panel explains the obvious assumption of the group that for the most part the problem of famine is a problem of production. While this assumption supports one among many legitimate biases, it is nonetheless a bias which clearly exerts a strong influence on these data. As previously stated, the panelists suggested that, like education and training, the socio-cultural dimension should be addressed as part of all research wherever possible. Concern was expressed, however, that such efforts should be directly relevant to the implications for bean/cowpea production and/or consumption.

Education, Training and Research Capability	G. da Silva-Dias Brasil - South America	Peter Goldsworthy I.I.T.A. - Global	T. Ferguson Caribbean Zone	C. N. Karue Kenya - East Africa	E. Mubaga Tanzania - East Africa	A. M. Pinchinat Meso-America	P. Graham C.I.A.T. - Global	C. Wien West Africa	D. H. Wallace	M. W. Adams	P. W. Barnes-McConnell	J. Yohe AID - Washington
A. Stability or turnover of LDC and U.S. research personnel	9	8	5	2	12		4	7	6	5	5	2
B. Language capability of U.S. scientists	10	12	14	12	8		13	8	7	12	8	7
C. Trained LDC personnel insufficient in number	1	1	2	1	9		(1)	1	1	6	1	1
D. Inefficient or lack of screening procedures	11	7	13	-	10		7	14		14	14	8
E. Appropriate student training, motivate students	6	2	4	4	2		3	2		7	2	6
F. Scientists needed: breeders, physiologists, entomologists, economists, nutritionists, food technologists, pathologists	3	3	3	3	4		1	3	1	1	7	1
G. Technical support needed	12	4	6	5	5		2	4	2	2	10	3
H. Laboratory supplies and equipment needed	4	6	7	6	6		5	6	3	3	6	5
I. Continuing education of U.S. and LDC scientists	8	-	10	7	11		8	9	4	4	9	6
J. Transportation capability to field/research sites	12	5	9	8	3		9	12	5	8	3	4
L. Migration of scientists	5	11	1	9	13		6	10		9	12	(2)
M. University research budget cuts	7	9	8	10	7		11	11		10	11	9
N. Low level of education among populace	2	10	11	11	1		12	5		11	4	10

all of high priority, but not of a research nature, per se.

Discussion

It had been generally agreed in the LDC Advisory Group, as prioritizing commenced, that this category was of high priority, and that educational and training components should be incorporated into nearly every research project undertaken in the CRSP. This should mean more than the mere acceptance of LDC students into an academic training program. It should imply their involvement in the research being conducted, at the design stage if possible, but certainly in the research functions of data collection, analysis, and interpretation. But, additionally, it has been suggested that trainees receive one or more practical courses in such things as, for example, "Methodology of safe handling and applying of toxic chemicals in agriculture", or "Methods of land preparation and planting", or "Simple economic comparison of alternatives in subsistence farming practices". And for LDC students doing degree programs in U.S. universities, it has been suggested that some training in research organization and management be provided, since it will be from among these individuals that the research administrators will likely be selected.

Despite the low ranking accorded language capability of U.S. scientists, we still wish to emphasize the need for personal communication between the U.S. and LDC persons, including LDC farmers who most frequently are unable to converse in English. Indeed, if our efforts are to have any direct impact on the "poorest of the poor" farmers in the chosen countries, the ability to communicate relatively easily with a range of persons will be a necessity. Undoubtedly, in many countries, language facility beyond English will be required.

A P P E N D I X G

DRAFT JOINT RESEARCH OUTLINES

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BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

SENEGAL

I. Proposed Research

A. Topic. A program to improve the quality of cowpea varieties for production and utilization in semi-arid zones.

B. Constraint Area(s) to be Addressed

Limitations of the Physical Environment
Plant Pests and Diseases
Plant Response Limitations
Nutrition, Food Preparation & Health
Farming Practices

C. Description of Proposed Research (production and non-production)

1. Screening identifed material; breeding for drought and high temperature, and pest resistance.
2. Identifying farming techniques suitable for small farms which support the developed characteristics.
3. Entomological protection of crop.
4. Assessing nutritional value of varieties for human consumption.

D. Anticipated Long-range research goal(s)

Food self-sufficiency and improvement of nutrition and income for farm families.

E. First Year Objective(s)

1. Development of field trial design.
2. Initiate field trials.
3. Initiate program of education (identify student, apply to institution, commit funds for first year scholarship).
4. Definition of a long term research program.

F. Type of Professional Personnel Required

Senegal: 3 researchers
2 upper level technicians (ITA, IUT, BISH)
2 Technicians (ATA, BTH)

U.S.: 3 researchers
6 undergraduate students
2 Technicians

Country Senegal

II. Potential Collaborators

Host Country - P.I.:	M.N. Ndoye	Entomologist	CNRA, Bambey
Co-Investigators:	C. Dancette	Agronomist	CNRA, Bambey
		Bio-climatologist	
U.S. - P.I.:	A.E. Hall	Agronomist-Plant Physiologist	Dept. Botany & Plant Sci., Univ. Calif.-Riverside
	V. Marcarian	Agronomist-Plant Breeder	Dept. Plant Sciences, Univ. Arizona, Tucson
	K.W. Foster	Plant Breeder-Geneticist	Dept. Agronomy & Range Sci., Univ. Calif.-Davis

III. Anticipated Procedures

A. Proposed research site(s):

SENEGAL - CNRA at Bambey and its field stations at Louga, Thilmakha and Thienaba.

U.S. - Three field sites have been chosen in the U.S. which are appropriate for cowpea production and which have constrasting climates and soils. The University of California Agricultural Experiment Stations at Riverside and Davis and the University of Arizona Agricultural Experiment Station at Yuma-Mesa.

B. Proposed research methodology in brief:

SENEGAL -

1. Improved varieties
   a. Establish short cycle varieties resistant to drought.
   b. Establish erect varieties with flowering grouped in time and space.
   c. Establish varieties resistant to thrips and jassides.
   d. Improve fertility rate.
   e. Establish cowpea forage varieties.

Country Senegal

2. Entomological protection
   a. Assess control methods and their economic value.
   b. Inventory the ecology of cowpea insects in the country.
   c. Study the pest resistance of identified varieties.
   d. Coordiate field trials with other countries in the Bean/Cowpea CRSP.
   e. Study the relationship of cowpea insects and mixed cropping patterns.
3. Farming practices
   a. Put in place mixed cropping field trials.
   b. Study cowpeas in pure stands and in mixed cultures.
   c. Study seed density in relation to water balance.

U.S. - Experimental lines and cultivars will be selected from cowpeas developed by the U.S. collaborators, ISRA (Senegal), IITA and other organizations. These cowpeas will be evaluated at the three contrasting field sites in the U.S. to permit selection of parent material for specific breeding programs. The field sites will also be used for evaluating the progeny produced by these breeding programs and crop management methods.

At Riverside, California cowpeas will be evaluated for drought resistance by growing them under different controlled levels of water supply in field conditions. These studies will be conducted during the hot, dry summer season when the absence of rain permits control of water supply through the use of stored soil moisture and supplemental irrigation. Data will be collected on agronomic, physiologic and morphologic characters with emphasis on yield, earliness, root development and osmotic adjustment. Screening procedures will be developed for characters that improve adaptation to drought for subsequent use by the research team in Senegal. Cowpeas will be grown with different row widths and plant spacing. Yield, crop growth and hydrologic balance will be measured to determine the plant spacings and rooting characteristics that are optional for dryland cropping.

At Yuma-Mesa, Arizona cowpeas will be evaluated for resistance to high temperatures. Initial field studies will be conducted under optimal irrigation during a season where daily air temperatures exceed 40° C on many days. Data will be collected on agronomic and physiologic characters with emphasis on yield, and

Country Senegal

flower and pod abscission. Screening procedures will be developed for characters that improve adaptation to high temperatures.

At Davis, California a general cowpea breeding program has been initiated. At this site, cowpeas will be performance tested under optimal irrigation and the drought produced by growth on stored soil moisture alone. Screening and breeding for resistance to pests (e.g. cowpea weevil and nematodes) and diseases.

C. Approximate time schedule over first year:

SENEGAL - February 1981 - Scientific meeting, elaboration of program and protocol
July - September 1981 - Plant and conduct field trials
September 1981 - Evaluate
December 1981 - Report results of first year evaluations and make additional plans for long term program

U.S. - During the first month of the project the U.S. collaborators will meet in the U.S. to develop a detailed plan for research at the three sites in the U.S., and to make arrangements for the initial planning meeting with ISRA scientists to be held at CNRA Bambey in Senegal. All field experients will be sown in the spring, and data will be collected during the summer. Final harvests will be completed by the early fall and data analysis will be completed by the next planning meeting in the winter.

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:
   a. Elaborate the research program and the experimental plan with the collaboration of all the researchers implicated in the project.
   b. All program activities to take place in Senegal will be under the jurisdiction of the researchers based in Senegal.
2. Anticipated responsibilities of U.S. researchers:

A.E. Hall is responsible for the coordination of research in the U.S., and for promoting interactions between U.S. and ISRA Collaborators through contact with the principal investigator assigned by ISRA. He is also responsible for the studies conducted at Riverside, California (such as the varietal trials and studies of drought resistance and improved crop management methods).

Country Senegal

V. Marcarian is responsible for the studies conducted in Arizona (such as the studies at Yuma-Mesa of resistance to high temperatures).

K.W. Foster is responsible for the studies conducted at Davis, California (such as the varietal trials and studies of pest and disease resistance).

The U.S. researchers will also have specific responsibilities relating to project activities resulting from the joint planning meeting in Senegal (including assisting ISRA research activities in Senegal and contributing to training programs in Senegal and the U.S.).

IV. Training Component (indicate number, levels and sites)

SENEGAL - 1 MS level entomologist (to be trained at Riverside, Davis or MSU), 6 person months of visiting scientist time in the U.S. for selected Senegalese scientists to study cowpea programs and problems in the U.S.

U.S. - During visits to Senegal the U.S. collaborators will provide the training in research methods that is requested by the principal investigator assigned by ISRA. U.S. collaborators will also guide Senegalese students sent to their respective U.S. universities by the principal investigator of ISRA.

Country Senegal

V. Estimated Budget for First Year

S E N E G A L

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: Expended in/for Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	50 %	$	$ 12,000	$	$
b. Co-investigators	1 + 1	30+100	$	$ 31,200	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$	$
b. Other Professionals			$	$	$	$
c. Graduate Students			$	$	$	$
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical	1	100	$	$ 2,400	$	$
f. Technicians	4	100	$	$	$	$ 36,00
TOTAL SALARIES AND WAGES						
B. Fringe Benefits (if charged as Direct Costs			$	$ 45,600	$	$ 35,00
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$	$	$	$
D. Equipment			$	$	$	$
E. Materials and Supplies			$	$	$	$ 13,30
F. Travel--1. Domestic (Including Canada, U.S.)				2,000		
2. Foreign						9,00
3. Accompanying Dependents (for long-term assignments)			$	$	$	$
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$ 2,000	$	$
J. Publication Costs/Page Charges			$	$	$	$ 2,00
K. Computer Costs			$	$ 5,000	$	$
L. All Other Direct Costs			$	$ 2,000	$	$
M. Training Costs			$	$	$	$ 10,00
N. Total Direct Costs (C through M)			$	$ 56,600	$	$ 88,30
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs (30 %)			$	$ 20,000	$	$ 21,00
P. Total Direct and Indirect Costs (N plus O)			$	$ 76,600	$	$ 90,00

PERSONS PREPARING THIS DOCUMENT:	Name	Title and Address
Host Country:	Dr. THIONGANE	Directeur Général de l'ISRA - Dakar
	Mahawa M'BODJ	Directeur du CNRA - Bambey
U.S.		

S/C PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

Country Senegal

V. Estimated Budget for First Year

U. S.

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I. Hall, A. E.	1	30	$ 9,149	$	$	$
b. Co-investigators	2	10/10	$ 4,800	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$	$
b. Other Professionals			$	$	$	$
c. Graduate Students			$	$	$	$
d. Pre-Baccalaureate Students a/	3	15 wks.	$	$	$ 14,868	$
e. Secretarial-Clerical		ea.	$	$	$	$
f. Technicians	2	10/10	$ 4,332	$	$	$
TOTAL SALARIES AND WAGES			18,281		14,868	
B. Fringe Benefits (If charged as Direct Costs			$ 4,527	$	$ 297	$
C. Total Salaries, Wages, and Fringe Benefits (A + B) a/ Field assistants			$22,308	$	$ 15,165	$
D. Equipment			$	$	$	$
E. Materials and Supplies—field studies at 3 sites			$	$	$ 11,836	$
F. Travel—1. Domestic (Including Canada, U.S.) Planning mtg./US scientists					300	
2. Foreign Initial planning mtg./Senegal/3 US scientists @$2000					6,000	
3. Accompanying Dependents (for long-term assignments)			$	$	$ NA	$
G. Shipment and Storage of Household Goods			$	$	$ NA	$
H. Housing Allowances Per diem expenses/Senegal			$	$	$ 450	$
I. Orientation and Medical Expenses			$	$	$ NA	$
J. Publication Costs/Page Charges			$	$	$	$
K. Computer Costs			$	$	$ 200	$
L. All Other Direct Costs			$11,543**	$	$ 400***	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$34,351	$	$ 34,351	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) Total Indirect Costs 31% of MTDC			$10,649	$	$ 10,649	$
P. Total Direct and Indirect Costs (N plus O)			$45,000	$	$ 45,000	$

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:		
U.S.	A. E. Hall	Associate Professor, Botany & Plant Sciences University of California, Riverside

B/C PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

** Cost of field operations ***Repairs to equipment

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

CAMEROON

I. Proposed Research

A. Topic: Maximizing cowpea yields without pesticides with attention to agronomic practices, the relationship of insect pest cycles, and labor demands on farmers.

B. Constraint Area(s) to be Addressed

(1.) Limitations due to pests and diseases;
(4.) Farming Practices Limitations:
(5.) Storage and Commodity Maintenance;
(8.) Socio-Cultural Factors

C. Description of Proposed Research (production and non-production)

1. Identify major field and storage insects.
2. Assess effects of these insects on plants.
3. Investigate the biology of the insects.
4. Study the effects of various agronomic practices (e.g. planting date, plant density, intercropping, variety performance).
5. Assess the relationship of overall labor demands on the small farm family to the actual cowpea production.

This research is proposed for a semi-arid zone; is to be conducted in cooperation with the Institut de Recherches Agronomiques of the Government of Senegal and will be coordinated with the activities of IITA, SAFGRAD, SPV/RFCP and other appropriate research services and programs.

D. Anticipated Long-range research goal(s)

1. Produce higher yields of cowpeas without insecticides.
2. Increase the availability of cowpeas for small farm family consumption.
3. Contribute to the knowledge of insects affecting cowpeas under Cameroonian farming conditions.

E. First Year

1. Identify major cowpea insects and the cowpea varieties resistant to them.
2. Identify appropriate agronomic practices and varieties to include in first year field trials.
3. Observe cowpea agricultural practices of small farmers during the growing season and at harvest.
4. Purchase necessary equipment and supplies.

Country Cameroon

F. Type of Professional Personnel Required

A U.S. researcher who will work with the Cameroonian researcher in directing the research, and will supervise a U.S. entomology student working in Cameroon in the field.

A U.S. researcher to facilitate and supervise a Cameroonian student to begin an academic program in entomology in the U.S.

II. Potential Collaborators

Host Country - P.I.:	Mr. Binzi	Soil Science	IRA Maroua
Co-Investigators:	Mr. Djambong	Entomology	IRA Maroua
	Mr. Fobasso	Agronomy	IRA Maroua
U.S. - P.I.:	Dr. Richard Chalfant	Entomology	Univ. of Georgia
	Dr. J.A. Renwick	Entomology	Boyce Thompson Institute

III. Anticipated Procedures

A. Proposed research site(s):

Maroua
Ngaoundere
Sangueri (Garoua)
Soucondou (Guider)
Mokolo

B. Proposed research methodology in brief:

1. Identify the important pests and their biology
2. Test local cowpea varieties most important in the semi-arid zone of north Cameroon in mixed cropping and compare them with improved varieties. Do biological examinations, assessing insects and their parasites. Replicate field trials on plots in different locales assessing the insects, the damage in the critical periods of plant development (flowering) and when most of the pods are formed.
3. Manipulate agronomic practices on local and promising varieties including different densities, in different patterns of mixed cropping to evaluate the insect populations and their damage and the yields gained from acceptable experimental methodologies.
4. Isolate specific insect problems in cages and in laboratory

conditions (plant cages). Raise the insects on the plants in order to determine the type and extent of the parasite.

5. Evaluate control methodologies and experimental methods acceptable on farms. Example: Use of insect juice to reduce insect damage.

C. Approximate time schedule over first year:

June - July: Prepare the fields and put in place the trials

August - September: Observation and assessments

October - November: Harvest--interpretation of results

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:

   a. Work in collaboration with the U.S. student and the U.S. supervisor.
   b. Inspect the trial sites, visit the fields to follow the agreed upon activities.
   c. Find housing and office space for U.S. personnel (the student and visiting U.S. researcher). Make vehicle available for their use (maintenance and gas to be paid for by project).

2. Anticipated responsibilities of U.S. researchers:

   a. Provide the supervision for the research activity carried out in the field (including the pests identification) and in the laboratory by the U.S. student
   b. Supervision of the overall trial work of the U.S. student by the U.S. researcher.
   c. Collaborate with the Cameroonian researcher.

IV. Training Component (indicate number, levels and sites)

Cameroon student to study at Masters level and later for Ph.D. Between MS and Ph.D the student must return to work with the project for a while.

Country Cameroon

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	___	___	$	$ x	$	$
b. Co-investigators	___	___	$	$ x	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Fosecc	___	___	$	$	$	$
b. Other Professionals	___	___	$	$	$	$
c. Graduate Students	___	___	$	$	$	$
d. Pre-Baccalaureate Students	___	___	$	$	$	$
e. Secretarial-Clerical	___	___	$	$ x	$	$
f. Technicians	___	___	$	$ x	$	$
TOTAL SALARIES AND WAGES			$	$	$	$
B. Fringe Benefits (If charged as Direct Costs			$	$	$	$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$	$	$	$
D. Equipment - Host will make vehicle available			$	$ x	$	$ 10,000
E. Materials and Supplies			$	$	$	$ 10,000
F. Travel--1. Domestic (Including Canada, U.S.)						6,000
2. Foreign						
3. Accompanying Dependents (for long-term assignments)			$	$	$	$
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances and per diem			$	$	$	$ 15,300
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$	$
K. Computer Costs			$	$	$	$
L. All Other Direct Costs-Gas & vehicle maintenance			$	$	$	$ 5,000
M. Training Costs & Scholarship			$	$	$	$ 20,300
N. Total Direct Costs (C through M)			$	$	$	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						(66,000)
Total Indirect Costs		24%	$	$	$	$ 15,340
P. Total Direct and Indirect Costs (N plus O)			$	$	$	$
					Inflation 15%	12,276
						94,116

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:		
U.S.		

B/C PLANNING OFFICE REPRESENTATIVE Dr. Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

NIGERIA (NSUKKA)

I. Proposed Research

A. Topic: Appropriate Technology for Cowpea Preservation and Processing, and a study of its Socio-Economic Impact on Rural Populations in Nigeria.

B. Constraint Area(s) to be Addressed
Storage and Commodity Maintenance; Production-Consumption Economics; Nutrition, Food Preparation and Health; Socio-Cultural Factors.

C. Description of Proposed Research (production and non-production)

Nigeria produces nearly 1 million Metric tonnes of cowpeas annually. In a national diet characterized by a disproportionate intake of carbohydrates, the content and quality of cowpea protein can make significant improvements in achieving better balance in the dietary pattern. This potential has remained unrealized, particularly in the rural areas and among the urban poor, because of the enormous storage losses of nearly 30% sustained by this crop; the laborious, time-consuming and energy-demanding preparation methods; and the incidence of anti-nutritional factors associated with it. This project is designed to foster the efficient utilization of cowpeas, particularly among Nigeria's rural population and urban poor - specifically, the study will identify and characterize socio-economic, socio-cultural, and technical factors which act to prevent efficient utilization of cowpeas and will provide "solution packages" in the form of an appropriate mix of products, technologies and policy instruments that would promote the resourceful utilization of cowpeas in meeting a substantial part of the protein requirement in the diet of the Nigerian rural people and the urban poor.

D. Anticipated Long-range research goal(s)

1. Establish patterns of cowpea utilization in Nigeria and elucidate the associated socio-cultural and socio-economic factors.
2. Develop a package of appropriate techniques + technologies of cowpeas adapted specifically to satisfy identified needs.
3. Develop policy guidelines (for use of policy makers) to foster efficient utilization of cowpeas through the promotion of consumption, rural industries, and the associated linkage to rural/urban markets and to farming activities in rural areas.

Country Nigeria (Nsukka)

E. First Year Objective(s)

1. Preliminary survey of the socio-cultural and socio-economic status of cowpeas, including usage patterns in selected communities of the local government area (county) of Anambra State of Nigeria. Survey and measurements will show the role of cowpeas in the nutritional status of target communities.
2. Survey of existing and potential technologies for cowpea processing. Development of a low-cost and effective technology for dry-dehulling of cowpeas.

F. Type of Professional Personnel Required

Faculty and technicians at the University of Nigeria and the University of Georgia

II. Potential Collaborators

Host Country - P.I.:	P.O. Ngoddy	Food Eng.	Dept. of Food Sci.
Co-Investigators:	Z.A. Obanu	Food Chemist	Univ. of Nigeria
	I.C. Obizoba	Nutritionist/ Food Analys.	Univ. of Nsukka
	D.O. Nnanyeluga	Nutritionist	Univ. of Nsukka
	N.D. Onwuka	Chem. Engr.	Univ. of Nsukka
	V.I. Innorah	Home Econ.	
	A. Dike	Sociologist	Dept. of Soc./ Anthropology
U.S. - P.I.:	Kay H. McWatters	Food Sci.	
	M.S. Chhinnan	Food Engr.	Univ. of Georgia
	R.D. Phillips	Nutritionist	Experiment, GA
	R.E. Worthington	Lipid Chemist	30212, USA
	L.R. Beuchat	Food Microbio.	

III. Anticipated Procedures

A. Proposed research site(s):

1. University of Nigeria, Nsukka: Depts. of Food Science, Home Economics, and Sociology and Anthropology.
2. University of Georgia: Dept. of Food Science (Experiment, GA).
3. Fieldwork and surveys will be carried out in selected communities in Nigeria chosen to give a representative

Country Nigeria (Nsukka)

picture of the national patterns of cowpea utilization. In the long-term, Nigeria will be divided into 4 ecological zones. Representative communities will be selected in each zone. Surveys will begin in the East zone 1st year.

B. Proposed research methodology in brief:

In the first year, two specific studies will be pursued in parallel:

1. Questionnaire-based study designed to elucidate socio-cultural and dietary factors in cowpea factors in cowpea consumption. Anthropometric and household measurements will be taken. Identification and evaluation of prominent cowpea varieties, storage practices, processing, utilization, and acceptability of cowpea products will be undertaken. Chemical, biological, and sensory methods will be applied.
2. Surveys of available techniques for milling cowpeas in various parts of the world through enquiries and visits, where necessary, will be done. Information will be screened and synthesized. Complementary work on process development, hardware design, fabrication, and testing of flours will be undertaken for cowpea dehulling. Effort will be primarily directed toward developing a dry-dehulling method. Preliminary analysis of dehulled cowpeas for assorted potential uses will be carried out.

For the long-term (5 years), surveys and associated measurements shall be expanded to encompass the entire country of Nigeria to establish a reliable national picture of cowpea usage patterns, its socio-cultural, and nutritional significance. Collateral laboratory and pilot plant studies centered on product development from cowpea flours, quality assessment, and technical innovation will go forward. In all cases, product acceptance and technological appropriateness will be determined on the basis of the extent to which the needs of rural population and urban poor can be satisfied. A systematic build-up of competencies at the Univ. of Ife (Nigeria) will be pursued to make it possible for the Nigerian research team to achieve self-reliance and to be able to commence research in new directions.

C. Approximate time schedule over first year:

1. Field surveys and study in Nigeria - 6 months; Chemical, organoleptic and nutritional analysis of cowpeas and traditional products of cowpeas in Nigeria - 4 months; Study of existing cowpea processing technologies, synthesis of information, design, prototyping, fabrication,

Country Nigeria (Nsukka)

and testing of cowpea dehulling hardware - 6 months; Compilation of data, analysis and report - 1 month. Activities will run concurrently.

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:

1. Design of questionnaire consultatively with American counterparts.
2. Anthropometric measurements
3. Laboratory analysis - proximate biological, and organoleptic.
4. In conjunction with American counterparts, survey cowpea processing technologies.
5. Collaboratively with American counterparts, undertake synthesis, design and testing of new processes and equipment.
6. Interpretation of data.
7. Collectively prepare and publish final reports of findings.

2. Anticipated responsibilities of U.S. researchers:

In addition to collaborative responsibilities with Nigerian researchers outlined above concerning design of questionnaire, surveys of cowpea processing technology, testing of process and dehulling equipment, interpretation of data, and preparing reports, the U.S. side shall be responsible for carrying out appropriate statistical analysis of data, conducting chemical (amino acid, B vitamins) and biological (PER) analysis of unprocessed and processed cowpeas and products, and evaluation of organoleptic properties of cowpeas and products as affected by methods of treatment and preparation; to advise and train Nigerian students engaged in research in the U.S.

IV. Training Component (indicate number, levels and sites)

Year 1 - One Nigerian graduate student at University of Georgia

Years 2, 3, 4, and 5 - One graduate student each year, two post-doctoral research associates (Nigerian) over four years (University of Georgia and University of Nigeria)

Country Nigeria (Nsukka)

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	25	$ 7,000	$ one	$	$
b. Co-investigators	4	30	$ 6,500	$ six	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$	$
b. Other Professionals			$	$	$	$
c. Graduate Students			$	$	$	$ 5,300
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical			$	$ Yes	$	$
f. Technicians			$	$	$	$
TOTAL SALARIES AND WAGES			13,500			
B. Fringe Benefits (If charged as Direct Costs			$ 2,970	$ Yes	$	$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$ 16,470	$	$	$ 5,300
D. Equipment			$	$ Yes	$ 8,000	$ 15,000
E. Materials and Supplies			$	$ Yes	$ 9,500	$ 9,915
F. Travel--1. Domestic (Including Canada, U.S.)					1. 1,200	1. 4,000
2. Foreign					2. 2,800	2. 8,000
3. Accompanying Dependents (for long-term assignments)			$	$	$ 4,000	$ 12,000
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$	$
K. Computer Costs			$	$	$ 1,000	$
L. All Other Direct Costs			$	$ Yes	$	$
M. Training Costs			$	$ Yes	$	$
N. Total Direct Costs (C through M)			$ 16,470	$	$	$ 42,415
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs 46.67 of S & W			$ 7,291	$ Yes	$	$ 2,585
P. Total Direct and Indirect Costs (N plus O)			$ 23,761	$	$ 22,500	$ 45,000

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	P. O. Mgoddy	Professor of Food Engineering & Head Dept. of Food and Home Sciences, University of Nigeria, Nsukka, Nigeria.
U.S.	L. B. Bencher	Associate Prof., Dept. of Food Science, Univ. of Georgia, Experiment GA 30212 USA

S/C PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

NIGERIA - IBADAN/JOS

I. Proposed Research

A. Topic: Medical problems associated with feeding cowpeas to children

B. Constraint Area(s) to be Addressed

(7.) Nutrition, Food Preparation and Health
(8.) Socio-Cultural Factors

C. Description of Proposed Research (production and non-production)

Discussion in Nigeria confirmed the relative reluctance of mothers to use cowpeas in infant feeding especially under the age of one year. Bloating, diarrhea and cramping are some reported side effects in children of weanling age. Sudden death while asleep, commonly known in Yoruba language as "soku dale" (death at night) is believed by mothers to be related to a particular cowpea diet when fed to babies late at night. Clinicians working in this area believe that problems with cowpea consumption are more common with feeding of whole grain rather than de-hulled cowpea, occur more commonly in babies under nine months of age and only in about 10 percent of these under one year, but much less thereafter. These not withstanding, the use of dietary cowpeas in older children is fairly widespread. Specific factors responsible for such side effects have not been studied before. This proposal is aimed at investigating the major causal factors in a systematic way by starting with community survey to obtain baseline information on socio-cultural factors associated with cowpea use and continuing with animal experiments to explore the toxicity of cowpea testa constituents and including infant feeding studies at demonstration communities.

D. Anticipated Long-range research goal(s)

These include increasing the use of cowpea as low cost source of protein for infant feeding in Third World countries by identifying and eliminating factors that produce undesirable effect as well as determining ways of increasing acceptance in day to day use of cowpea by currently reluctant mothers once less disturbing types are developed.

E. First Year Objective(s)

IBADAN - 1. Develop, standardize and pilot test survey instrument for assessing prevelance of side effects, attitude, etc.
2. Profiling the constituents of cowpea testa and

evaluating the "toxicity" of such constituents in animal experiments.

3. Identify and study the 10 percent of older children who develop side effects with cowpea diets.
4. Determine changes in microbial colonization of intestinal tract of children following regular cowpea consumption.

JOS - 1. Train professionals in use of Breath Hydrogen Analyzer in metabolic studies.
2. Determine changes in G.I. transit time associated with feeding of cowpea meals to children (weanlings)
3. Determine associated changes in immune globulin profile of children who react to cowpea meals.
4. Describe changes in intestinal microbial flora associated with cowpea meals.

F. Type of Professional Personnel Required

Physicians, chemical pathologist, food scientist, nutritionists, microbiologist, epidemiologist

II. Potential Collaborators

I B A D A N

	Researchers	Discipline	Professional Address
Host Country - P.I.:	Prof. A. Omololu	M.D./Nutritionist	Dept. of Human Nutrition U. of Ibadan
U.S. - P.I.:	C. Amechi Akpom	M.D./Epidemiologist	Col. of Human Medicine -MSU
	David S. Greenbaum	M.D./Gastroenterologist	Col. of Human Medicine -MSU
	P. Markarkis	Food Scientist	Dept. of Food Sci. -MSU
	Wanda Chenoweth	Food Scientist	Dept. of Food Sci. -MSU
	Harold Sadoff	Microbiologist	Dept. of Microbiology & Public Health -MSU

Country Nigeria - Ibadan/Jos

II. Potential Collaborators (cont.)

J O S

	Researchers	Discipline	Professional Address
Host Country - P.I.:	David Drew MRCP	Pediatrician	Faculty of Medical Sciences/ Jos
Co-Investigators:	Peter Isichie MD	Chem. Path.	
	Nicholas Okere MBBS	Comm. Med.	
U.S. - P.I.:	C. Amechi Akpom MD	Epide-miologist	Col. of Human Med.
	P. Markakis, Ph.D.	Food Scientist	Dept. of Food Sci.
	Wanda Chenoweth Ph.D.	"	"
	Harold Sadoff, Ph.D.	Microbiolgist	Dept. of Microbiology & Public Health -MSU
	David S. Greenbaum	Gastroenter-ologist	

III. Anticipated Procedures

A. Proposed research site(s):

IBADAN - University of Ibadan, Ibadan, Nigeria
University of Jos, Jos, Nigeria
Michigan State University, East Lansing, Michigan, USA

JOS - University of Jos, Jos, Nigeria
University of Ibadan, Ibadan, Nigeria
University of Nigeria, Nsukka, Nigeria
Michigan State University, East Lansing, Michigan, USA

B. Proposed research methodology in brief:

IBADAN - Methodologies are summarized under each study heading.

Study (1). Survey instrument development and standardization: Questions to be used will be contributed by participants from various component areas and coordinated from the University of Nigeria, Nsukka as part of their other surveys. Pilot to be done at Nsukka and Jos. Data analysis to be carried out at Michigan State University, i.e., reliability, validity, content analysis, etc.

Country Nigeria - Ibadan/Jos

Study (2). Brief interview survey of all women at Osegere Village (a demonstration village) to identify attitudes of mothers and others to feeding cowpeas to their children. Following this, children at the village will receive supplementary feeding to attempt to identify any side effects.
Study (3). Profiling of constituents of cowpea testa: Limited literature survey to be undertaken at Ibadan and MSU will be done to determine the already known potentially "toxic" substances in testa. In addition, testa from dehulled cowpeas will be homogenized, fractionated and analysed by Food Scientists at MSU. Animal experiments will be done to determine gastro-intestinal toxic effects in a controlled study design.
Study (4). To determine changes in microbial colonization of intestinal tract. Stool from children fed on cowpeas and from controls will be collected, individually homogenized, plated out and innoculated into transport medium for immediate transmittal to Michigan State University for identification, quantification and qualitative evaluation of organisms in them.

JOS - Methodologies are summarized under each study heading.

Study (1). Development and Standardization of Survey Instrument - Questions relating to medical aspect of cowpea consumption to be contributed from Jos faculty. But conduct of Pilot survey to be coordinated by participating staff at University of Nigeria, Nsukka. Jos will be one of the survey locations.
Study (4). Determination of microbial colonization of intestinal tract of children fed on cowpea - Stool to be collected from children fed on cowpeas and a control diet as well as from other controls, then individually homogenized, plated out and innoculated into transport media for immediate transmittal to Michigan State University where identification, quantification and qualitative evaluation of content will take place.
Study (4b). Determine immuneglobulin profile of children reacting to cowpea food: Blood samples taken from children before and after cowpea meals over periods of time will be analyzed to provide immune-globulin profile. Comparison will be made between reactors and non-reactors. Samples to be retained for later agglutinin identification.
Study (4c). Determine intestinal transit time of cowpea meals in children: Plan is to use radio-opaque pellets in cowpea meal to measure transit time by X-raying timed stools collected in paper boxes.
Training program: In anticipation of needed metabolic

Country Nigeria - Ibadan/Jos

studies in Year II, the pediatrician will visit Michigan State University for a short training in the use of Breath Hydrogen Analyzer for metabolic studies in children. On his return he will train at least one individual from the other two participating institutions in the use of the instrument.

C. Approximate time schedule over first year:

IBADAN - Instrumentation, standardization, pilot, analysis of data - 9 months. Animal experiments, profiling of test constituents - 10 months. Identification and study of children with side effects, after cowpea meals - 10 mos. Microbial colonization study - 6 months. Report - 2 months. All studies to be conducted concurrently.

JOS - Pilot Community Survey Instrument Standardization, analysis of data - 9 months. Microbial colonization of study - 6 months. Immuneglobulin component survey of serum of reacting children - pilot 6 months. Study of G.I. transit time - 6 months.

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:

IBADAN - a. Participating in compilation of questions for use in construction of survey instruments on socio-cultural and health related factors in cowpea consumption.
b. Screening interview and test feeding of children to define the prevalence and identify children who develop diarrhea following cowpea consumption.
c. Obtaining stool samples from children who are fed on cowpeas and their controls according to predetermined protocol.
d. Training or technicians for use in microbial colonization study.
e. Performing limited literature survey to identify known testa "toxic" factors.

JOS - a. Participation in compilation of questions for use in developing survey instrument.
b. Obtaining stool samples from children fed on cowpeas and their controls and conducting initial routine stool examination before forwarding to Michigan.
c. Examination of serum protein profile in children with side effects from cowpea consumption.

Country Nigeria - Ibadan/Jos

d. Training participants from other centers in use of Breath Hydrogen Analyzer techniques.
e. Study of G.I. transit time of cowpea feeds in children.

2. Anticipated responsibilities of U.S. researchers:

IBADAN - a. Participating in instrument development and computer analysis of data from pilot survey to report on standardization of data--reliability, validity, testing, content analysis.
b. Limited literature review for known "toxic" constituents of cowpea testa and profiling of constituents of testa.
c. Conducting animal experiments to test for "toxicity" of constituents on the gastro-intestinal tracts of animal models.
d. Identification, and quantification of intestinal flora of children fed on cowpeas, (using stool samples).

JOS - a. Participating in instrument development and computer analysis of data from pilot survey to report on standardization of data--reliability, validity, testing, content analysis.
b. Limited literature review for known "toxic" constituents of cowpea testa and profiling of constituents of testa.
c. Conducting animal experiments to test for "toxicity" of consituents on the gastroin-testinal tracts of animal models.
d. Identification, and quantification of intestinal flora of children fed on cowpeas, (using stool samples).

IV. Training Component (indicate number, levels and sites)

IBADAN - Training of one full time equivalent of field workers for use in feeding studies and in stool collection studies during the first year.

JOS - 1. Pediatrician from Jos to visit M.S.U. for 2 week training in use of Breath Hydrogen Analyzer techniques for metabolic studies in children.
2. Pediatrician to subsequently train three other indigenous participants; one from each site.

Summary of Budget (First Year) NIGERIA

(MSU, Ibadan & Jos combined)

		Contribution from M.S.U.	Requested from Title XII	
			Expended in U.S.	Expended in/for Host Country
C.	Salaries, Wages and Fringe Benefits	$25,944	$14,400	$26,620* (Ibadan & Jos)
D.	Equipment	-	3,000	3,500
E.	Materials & Supplies	-	3,000	4,100
F.	Travel			
	1. Domestic (for Host Country participants)	-	-	2,780
	2. Foreign	-	-	3,000
	3. Accompanying Dependents	-	-	500
G.	Shipment & Storage (Air freighting of specimens)	-	-	3,500
J.	Publication Cost	-	500	-
K.	Computer Cost	-	1,500	-
M.	Training Cost	-	-	1,000
N.	Total Direct Cost:	$25,944	$22,500	$45,000

*Includes $4,500 to be expended in the U.S. on behalf of host country graduate student

Country Nigeria (Ibadan)

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate *Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII Expended in US	Requested from Title XII Expended in/for Host Country
			*U.S. contribution & Expenditure shown on Ibadan budget			
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	2	15%	$	$	$	$ 2,500
b. Co-Investigators	2	10%	$	$	$	$ 2,000
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$	$
b. Other Professionals			$	$	$	$
c. Graduate Students			$	$	$	$
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical	1	50%	$	$	$	$ 1,000
f. Technicians (2 labs, 3 interviewers)	5	25% (avg.)	$	$	$	$ 4,000
TOTAL SALARIES AND WAGES						10,500
B. Fringe Benefits (if charged as Direct Costs			$	$	$	$ -
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$	$	$	$10,500
D. Equipment (Breath Hydrogen Analyzer)			$	$	$	$ 2,000
E. Materials and Supplies			$	$	$	$ 1,000
F. Travel--1. Domestic (including Canada, U.S.) (Within Nigeria for host country participants)						1,000
2. Foreign						
3. Accompanying Dependents (for long-term assignments) (To U.S.A. for host country participant training)			$	$	$	$ 3,000
G. Shipment and Storage of Household Goods			$	$	$	$ 500
H. Housing Allowances			$	$	$	$ 500
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$	$
K. Computer Costs			$	$	$	$
L. All Other Direct Costs			$	$	$	$
M. Training Costs			$	$	$	$ 1,000
N. Total Direct Costs (C through M)			$	$	$	$20,000
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs			$	$	$	$
P. Total Direct and Indirect Costs (N plus O)			$	$	$	$

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	David Drew M.R.C.P.	Lecturer in Pediatrics, Faculty of Medical Sciences
U.S.	C. Amechi Akpom, M.D., Ph.D.	Dept. of Community Health Science, Michigan State University, East Lansing, Michigan

S/C PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

Country Nigeria (Jos)

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	2	15(avg)	$ 6,300	$ 1,000	$ -	$ 1,000
b. Co-Investigators	4	10(avg)	$ 10,000	$ -	$ -	$ 3,000
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	-		$	$	$	$
b. Other Professionals	2	50	$	$	$ 6,000	$ 1,000
c. Graduate Students	2	50*	(one host country student in U.S.)			$ 6,444
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical	2	25(avg)	$ 2,500	$	$ 2,500	$ 1,490
f. Technicians	2	30(avg)	$	$	$ 2,000	$ 3,186
TOTAL SALARIES AND WAGES			18,800	1,000	10,500	16,120
B. Fringe Benefits (If charged as Direct Costs			$ 7,144	$ -	$ 3,990	$ -
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$ 25,944	$ 1,000	$ 14,490	$ 16,120
D. Equipment			$	$	$ 3,010	$ 1,500
E. Materials and Supplies			$	$	$ 3,000	$ 2,600
F. Travel--1. Domestic (including Canada, U.S.)			(Domestic for Nigerian counterparts within Nigeria)			1,780
2. Foreign						
3. Accompanying Dependents (for long-term assignments)			$	$	$	$
G. Shipment and Storage of Household Goods			(Air freighting specimen)		$	$ 3,000
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$ 500	$
K. Computer Costs			$	$	$ 1,500	$
L. All Other Direct Costs			$	$	$	$
M. Training Costs			$	$ 550	$	$
N. Total Direct Costs (C through M)			$ 25,944	$ 1,550	$ 22,500	$ 25,000
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) Total Indirect Costs			$	$	$	$
P. Total Direct and Indirect Costs (N plus O)			$	$	$	$

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	Professor A. Omololu, M.D.	Chairman
		Dept. of Human Nutrition
		University of Ibadan, Ibadan, Nigeria
U.S.	C. Amechi Akpom, M.D., Ph.D.	Associate Professor, Dept. of Community
		Health Science, Michigan State University
		East Lansing, Michigan 48823

B/C PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

Rationale for Proposed Research

The use of cowpea in diets in West Africa is so widespread that there is a tendency to assume that problems associated with its use can be ignored because they are small when compared with the extent of its use in the diet. As someone said, "I am prepared to give cowpea the benefit of the doubt due to its performance so far". While this view may be tenable for the general population, it definitely is questionable when it concerns specific subgroups of the population, such as weanlings and younger children. Furthermore, the questionableness increases when cowpea utilization in considered in relation to specific purposes.

Specifically, if one of the purposes is to increase production so that cowpeas may serve as a low-cost source of protein at periods or in areas where animal protein may not be available, then the current pattern of use of cowpea will not facilitate cowpea use in the weanling age group. Available documentation shows that cowpea is not a popular food item for weanling children. Yet weanlings and younger children are subgroups of the population who are highly vulnerable to protein calorie malnutrition. Hence, inspite of achieving increased cowpea production, availability of cowpea in the diets of these age groups will remain unchanged. This is because parents would not only continue to avoid feeding cowpeas to their children but in instances where children had to be fed cowpea (as during periods of famine), parents would attribute undesirable health outcomes to cowpeas, whereas other factors, many of which are present in Third World Countries, may be responsible for the poor outcomes.

While a web of complex factors are involved in non-use of cowpea in weanling diet or diets of younger children one category that is commonly pointed to is the undesirable effects of cowpea consumption in the age group of concern. Such undesirable effects have been amply documented in West Africa and include bloating, flatulence, cramps and in some cases diarrhea. In developing our hypotheses on the relationship of cowpea consumption to diarrhea in weanlings, the M.S.U. principle investigators had suggested that undigestable oligosaccharides (isolated by one of us - P.M. et al.) in cowpea might be acting as fermentable substrate which when acted upon by intestinal flora would release not only gases but also by-products which might encourage the development of osmotic type diarrhea. This hypotheses is, as yet, not tested. But our effort seems to be one of the first serious ones directed at examining the relationship between cowpea consumption and some of the several side effects: documentation of the occurence of side effects, notwithstanding. As an example, while extensive research work is currently going on at several locations in Nigeria on various aspects of cowpea nturition and food preparation, (such as the development of new cowpea dishes, supplementation of cowpea meals, processing, daily sale of cowpea fritters, etc.), very little effort is directed at the medical and/or health aspects of dietary cowpea. Specifically, little work is currently going on with respect to determining factors that are eitologic to the several undesirable effects. Since this determination is basic to being able to reduce the incidence of such effects, either through plant breeding, cowpea processing or any other means, it seems surprising that not much has been done about this important aspect of cowpea use.

That the impression of neglect is not primarily a result of our ignorance is the confirmation provided by many internationally respected Nigerian scientists who are directly involved in cowpea research. For example, Dr. Bede Okigbo, the Deputy Director of the International Institute of Tropical Agriculture (IITA) stated that as far as he knew, no one was examining that health aspect of cowpea

consumption. Professor Oduntan, the Chairperson of the Institute of Social and Preventive Medicine at the University of Ibadan attested to the same fact. She has been involved with well-baby and school health clinic work in Ibadan over the past 16 years and confirms that mothers would not feed cowpea meals to thier children because of the undesirable effects. Mrs. Williams, the co-author of the well known book Cowpeas: Home Preparation and Use in West Africa and the author of the monograph entitled A Preliminary Study of Consumer Preferences in Choice of Cowpeas - Western and Kwara States Headquarters and Areas in Nigeria, also stated that no one was examining this problem. Professor Omololu, the Chairman of the Department of Human Nutrition at the University of Ibadan who has been working on the nutritional value and use of Nigerian cowpea meals for several years, himself a physician as well as a nutritionist, confirmed that no one as yet is looking at that question. Yet they all agreed that it is an important aspect that deserves intensive examination.

In order to justify their views on the scope and importance of this problem, Dr. Oduntan described the common belief among Yoruba mothers that infant death at night "Soku Dale" is related to cowpea diet fed to infants and children earlier that night. She agreed that while this might really be "cot deaths" which are common in those age groups, the fact of continued association in the minds of mothers does not help the use of this important item of diet in this age group who can benefit the most from it. On the other hand, if the cummulative experience of mothers over several generations had resulted in valid conclusion regarding the association, it seems worthy of scientific inquiry directed at establishing true causal relationship. Dr. Omololu provided more specific information based on clinical experience of nutritionists in that part of the country over several years. He stated that undesirable effects:

(1) are more common in children below the age of 9 months.

(2) occur in about 10% of children under one year of age

(3) are less common in children over the age of one year

(4) may occasionally be encountered among adults

(5) tend to be more commonly associated with cowpea meals prepared from whole grain as opposed to dehulled grains.

The above information, considered on their own, raise several interesting questions. (a) At a global level, are these problems specific to a particular type of cowpea produced in Nigeria or are they commonly encountered at other places in Latin America, the Caribbean, and southern United States?

(b) Are these effects induced by "toxic" substances contained in the testa (hulls) of cowpea? In this respect about 4-5 such potentially toxic substances are already known to be present in the hull of cowpea.

(c) If the problems are host related, do they have a genetic basis similar to the 6-G.P.D. deficiency problems encountered with fava beans?

(d) Are the changes in incidence of side effects with age related to enzyme maturation or enzyme induction?

(e) Do these effects have immunologic basis which expresses itself only in atopic individuals?

(f) Are these side effects related to the methods of food preparation which produce compounds that act as haptens and induce hypersensitivity?

(g) Could there be a delay in gastro-intestinal transit time which allows time for bacterial production of enterotoxins that cause these effects?

(h) Who are the 10% of children that develop undesirable effects following ingestion of cowpea meals?

(i) What is the eitology of "Soku Dale"?

(j) Are most of the unpleasant side effects known?

Although undesirable effect is said to occur in about 10% of children under one year of age, its impact is clearly more widespread since most mothers are unwilling to take the risk. It therefore seems particularly important both to identify the characteristics of that 10 percent so that primary preventive measures can be undertaken by mothers and to identify factors that are responsible for the side effects so that they may be removed from cowpea meals, either prior to or during cowpea meal preparation.

The above questions are only preliminary since answers to most of them would raise other specific questions which may need to be answered. It will be seen that studies suggested for the first year of the project are designed to provide the first order information needed to unravel aspects of problems within the research constraint area: nutrition, food preparation, and health.

The expertise and types of scientists participating in the collaborative studies have been carefully selected to allow for multidisciplinary examination of this very complex problem. The involvement of host country personnel in this project is significant. Training programs are included as part of the first year activity and are designed to provide multiplier effect which will facilitate both objectives of studying problems within the constraint area and improving technological capabilities of host country scientists. The complementary nature of the different components of work assigned to host country scientists and M.S U. scientists attests to the true nature of the collaborative arrangement that has been proposed.

Finally, it must be emphasized that successful completion of our research would provide findings which have direct application to the work that is proposed by our counterparts at the University of Georgia in Athens, Georgia, and the University of Nigeria, Nssuka. Hence, offending components can be removed from beans that are used in the preparation of cowpea flour. This will then be tested for acceptability in traditional food and be subjected to sensory evaluation. The advantage being that the entire work would be done in the same host country.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

KENYA

I. Proposed Research

A. Topic: Drought and heat resistance in disease-resistant beans for semi-arid regions

B. Constraint Area(s) to be Addressed: Plant Response, Farming Prac.

C. Description of Proposed Research (production and non-production)

To evaluate the climatic and physiological factors related to flower/pod abscission; to breed for small farms in semi-arid areas bean cultivars which are resistant to drought, heat and diseases; to provide training for Kenyan scientists in the agricultural sciences; to study the roles of women and men in bean culture on small farms; to cooperate with other scientists in Kenya and international organizations in extending knowledge and adaptability of beans, and of increasing yield.

D. Anticipated Long-range research goal(s)

Analysis of biological, varietal and physical forces of the environment affecting plant performance with major emphasis on the development of drought, high temperature resistant cultivars with resistance to common diseases.

E. First Year Objective(s)

To evaluate potentially useful cultivars in field trials in Kenya and the U.S.; to study the roles of women and men in bean culture on small farms in semi-arid areas; to identify personnel for scientific training.

F. Type of Professional Personnel Required

Senior scientists, technicians, students, field hands

II. Potential Collaborators

	Researchers	Discipline
Host Country - P.I.:	Daniel Makunya	Breeder - Pathologist
Co-Investigators:	E. M. Gathuru	Virology
U.S. 2 - P.I.:	Barbara Webster	Crop Physiologist
	Giles Waines	Geneticist - Breeder

Country Kenya

III. Anticipated Procedures

A. Proposed research site(s):

Kenya - Kabete, Katumasi, Embu

U.S. - U.C. Davis, U.C. Riverside, South Coast Field Station, Imperial Valley, Tullake

B. Proposed research methodology in brief:

Cultivars will be screened for heat and drought tolerance and disease resistance in Kenya and the U.S.; replicated plots of common beans and tepary beans will be grown on field stations in Kenya and California under both dryland and irrigated conditions; salient physiological factors, including stress, will be measured under laboratory conditions; hybrids will be made between desirable parents of common beans and tepary beans; bean cultivation on small farms will be studied, emphasizing particularly constraints of labor, seed availability and agronomic practices; scientific personnel will be trained in field methodology.

C. Approximate time schedule over first year:

(ongoing - see below)

D. Division of labor:

1. Anticipated responsibilities of host country researchers: Cultivars resistant to prevalent diseases will be evaluated in Kenya; potential students will be selected for training; purchase of vehicle (pickup truck) for transportation in connection with the project.

2. Anticipated responsibilities of U.S. researchers: Screen and evaluate cultivars for drought and heat resistance in California; visit to semi-arid areas of Kenya, to study experimental plots there and to visit small farms in appropriate areas; to make hybrids between appropriate cultivars; to meet and confer, and to identify appropriate technical personnel.

IV. Training Component (indicate number, levels and sites)

Kenya - 4 students identified for advanced training; technicians selected and trained for lab and field experiments

U.S. - technicians selected and trained in appropriate laboratory and field techniques.

Country Kenya

V. Estimated Budget for First Year - Kenya

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	____	____	$	$	$	$
b. Co-investigators	____	____	$	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	____	____	$	$	$	$
b. Other Professionals	____	____	$	$	$	$
c. Graduate Students	____	____	$	$	$	$ 36,000
d. Pre-Baccalaureate Students	____	____	$	$	$	$
e. Secretarial-Clerical	____	____	$	$	$	$ 3,000
f. Technicians	____	____	$	$	$ 26,000	$ 7,000
TOTAL SALARIES AND WAGES						
B. Fringe Benefits (If charged as Direct Costs			$	$	$ 5,200	$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$	$	$	$
D. Equipment			$	$	$	$ 15,000
E. Materials and Supplies			$	$	$ 1,200	$ 3,000
F. Travel--1. Domestic (Including Canada, U.S.)					800	20,000
2. Foreign					10,000	4,000
3. Accompanying Dependents (for long-term assignments)			$	$	$	$
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$	$
K. Computer Costs			$	$	$	$
L. All Other Direct Costs			$	$	$	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$	$	$	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) Total Indirect Costs			$	$	$	$
P. Total Direct and Indirect Costs (N plus O)			$	$	$ 45,000	$ 30,000

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	D.N. Ngugi	Acting Dean, Faculty of Agriculture
	E.M. Ghthuru	Lecturer, Crop Science
U.S.	Barbara D. Webster	Professor, Agronomy, U.C. Davis
	J. Giles Waines	Assoc. Prof., Botany & Plant Sciences, U.C. Riverside

B/C PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

Country Kenya

V. Estimated Budget for First Year - U.S.

7/1/80 - 6/30/81	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Host Country
. Salaries and Wages						
1. Senior Personnel						
a. P.I. J.G.Waines/B.D. Webster	2	10/10	$ 6,188	$	$	$
b. Co-investigators	2	10/5	$ 5,051	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$	$
b. Other Professionals			$	$	$	$
c. Graduate Students			$	$	$	$
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical			$	$	$	$
f. Technicians	4	10%ea.	$ 10,444	$	$ 18,267	$
TOTAL SALARIES AND WAGES			21,683		18,267	
. Fringe Benefits (If charged as Direct Costs			$ 5,316	$	$ 4,384	$
. Total Salaries, Wages, and Fringe Benefits (A + B)			$ 26,999	$	$ 22,651	$
. Equipment			$	$	$	$
. Materials and Supplies			$	$	$ 3,000	$
. Travel—1. Domestic (Including Canada, U.S.)					800	
2. Foreign 2 trips to Kenya (@ $2,000 ea.)					4,000	
3. Accompanying Dependents (for long-term assignments)			$	$	$	$
. Shipment and Storage of Household Goods			$	$	$	$
. Housing Allowances Per diem expenses in Kenya			$	$	$ 3,300	$
. Orientation and Medical Expenses (for 2)			$	$	$ -0-	$
. Publication Costs/Page Charges			$	$	$ -0-	$
. Computer Costs			$	$	$ -0-	$
. All Other Direct Costs			$ 7,352	$	$ 600	$
. Training Costs			$	$	$ -0-	$
. Total Direct Costs (C through M)			$ 34,351	$	$ 34,351	$
. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs 31% of MTDC (on-campus)			$ 10,649	$	$ 10,649	$
. Total Direct and Indirect Costs (N plus O)			$ 45,000	$	$ 45,000	$

PERSONS PREPARING THIS DOCUMENT:	Name	Title and Address
Host Country:		
U.S.	J. Giles Waines	Assoc. Prof., Bot.&Plant Sci., UC Riverside
	B. D. Webster	Professor, Dept. of Agronomy, UC Davis

PLANNING OFFICE REPRESENTATIVE Pat Barnes-McConnell

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

TANZANIA

I. Proposed Research

A. Topic: Breeding beans for disease and insect resistance and determination of economic viability for small farmers.

B. Constraint Area(s) to be addressed
Non-availability of high-yielding, widely adapted, disease and insect resistant bean cultivars in East African region,

C. Description of Proposed Research (production and non-production)

1. Collect Tanzanian bean land races and best available cultivars from external sources.
2. Evaluate germplasm collection for (i) plant characters, (ii) resistance to anthracnose, rust, angular leaf spot, bean common mosaic virus, halo and common bacterial blight, (iii) maturity, (iv) yield, (v) resistance to bean fly in the field and bruchids in storage.
3. Develop breeding program using best parents.
4. Undertake surveys to determine present intercropping systems, labor, and other inputs, total production for family consumption and for sale, and the timing of harvest to satisfy various consumption and marketing factors.
5. Estimate impact of the new cultivars on subsistence-farm family labor inputs and incomes.

D. Anticipated Long-range research goal(s)

Production (through breeding) of high yielding, widely adapted, disease and insect resistant cultivars of beans which are acceptable to the subsistence farmer and to the consumer; estimate economic viability of the new cultivars and their impact on incomes and nutrition.

E. First Year Objectives

1. Germplasm collection of Tanzanian land races and best available external cultivars.
2. Evaluation of germplasm for agronomic characteristics, disease, and insect resistance.
3. Economic assessment of direct losses caused by selected diseases and insects.
4. Study of present farming system to determine inputs and timing of consumption and marketing.

Country Tanzania

F. Type of Professional Personnel Required

1. Agronomist, Ph.D.
2. Plant Breeder, Ph.D.
3. Entomologist, Ph.D.
4. Plant Pathologist, Ph.D.
5. Agricultural Economist, Ph.D.
6. Field Officer, B.S., Agriculture
7. Field Assistant, Diploma, Agriculture

II. Potential Collaborators

	Researchers	Discipline	Professional Address
Host Country - P.I.:	Dr. B. J. Ndunguru	Crop Physiologist	Morogoro
Co-Investigators:	Dr. A.L. Doto	Plant Breeder	Morogoro
	Dr. J.M. Teri	Plant Pathologist	Morogoro
	Dr. C.L. Keswani	Plant Pathologist	Morogoro
	Mr. A.N. Mphuru	Entomolgist	Morogoro
	Dr. A.K. Karel	Entomologist	Morogoro
	Dr. P. Anandajayasekeram	Ag Economist	Morogoro
U.S. - P.I.:	Dr. M. J. Silbernagel	Plant Pathologist	USDA-WSU, Prosser
Co-Investigator :	Dr. Jean Due	Ag Economist	U. of Ill., Urbana

III. Anticipated Procedures

A. Anticipated Procedures

1. Faculty of Agriculture, Forestry & Veterinary Science, Univ. of Dar es Salaam, P.O. Box 642, Morogoro, Tanzania
2. Washington State University, Irrigated Agric. Res. & Ext. Center, P.O. Box 30, Prosser, WA 99350 USA
3. Dept. of Agric. Economics, Univ. of Illinois, Urbana, IL 61801 USA

B. Proposed research methodology in brief:

1. Collect germplasm from domestic and foreign bean workers.
2. Define seed and plant characters as well as maturity and yield parameters under field conditions.
3. Rate the disease and insect damages on 0-10 scale and assess economic impact of losses.

Country Tanzania

4. Collect isolates of major pathogens from different locations, varieties, and cropping seasons. Test the same for race/strain variation on differential test varieties.
5. Identify horizontal and vertical sources of resistance using pathotypes identified.
6. Develop back-cross breeding program to maintain horizontal factors, incorporate vertical factors for resistance using pathotypes identified.
7. Test the crop protection effectiveness and economic impact of mixed cropping and multilines against selected diseases and insects.
8. Estimate economic viability of new varieties in mixed cropping systems for small farmers.

C. Approximate time schedule over first year:

1. Collection of germplasm - 2 months.
2. Record preliminary data on agronomic characteristics, disease and insect resistance and economic assessment of losses - 5 months.
3. Isolation of pathogens from germplasm evaluation trails, and testing of parental lines to identify vertical and/or horizontal resistance - 5 months.
4. Estimate economic viability of popular varieties - 1 month.
5. Survey of intercropping system - 5-6 months.

D. Division of labor:

1. Anticipated responsibilities of host country researchers:
   a. Collect, evaluate, and maintain germplasm.
   b. Identify parental material and develop hybridization program.
   c. Document crop losses and estimate economic value.
   d. Establish bean yield protection value (from selected disease and insects) of mixed crops and multilines.
   e. Assist in data collection re C4 and C5 above and in data analysis and reporting.

2. Anticipated responsibilities of U.S. researchers:
   a. Help plan research proposal.
   b. Identify strains of Bean Common Mosaic Virus and halo blight, and develop screening and breeding techniques for same (Silbernagel).
   c. Plan form of data collection re economic assessments and intercropping system (Due).
   d. Assist in computerization and analysis and report writing (Due).
   e. Supervise questionnaire design, implementation, and analysis (Due).

Country Tanzania

IV. Training Component (indicate number, levels and sites)

Estimate: 1 Ph.D. Ag. Economics, University of Illinois each year
1 Ph.D. Crop Science each year

Country Tanzania

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII	
					Expended in US	*Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	___	___	$	$	$	$
b. Co-investigators	___	___	$	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	___	___	$	$	$	$
b. Other Professionals	___	___	$	$	$	$
c. Graduate Students	___	___	$	$	$	$ 5,000
d. Pre-Baccalaureate Students	___	___	$	$	$	$ 1,000
e. Secretarial-Clerical	___	___	$	$	$	$ 2,000
f. Technicians	___	___	$	$	$	$ 5,200
TOTAL SALARIES AND WAGES			$	$	$	$ 3,300
B. Fringe Benefits (If charged as Direct Costs			$	$	$	$ 16,500
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$	$	$	$ 40,000
D. Equipment			$	$	$	$ 20,000
E. Materials and Supplies			$	$	$	6,000
F. Travel--1. Domestic (Including Canada, U.S.)						4,500
2. Foreign						
3. Accompanying Dependents (for long-term assignments)			$	$	$	$
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$	$ 1,500
K. Computer Costs			$	$	$	$ 1,500
L. All Other Direct Costs			$	$	$	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$	$	$	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs			$	$	$	$
P. Total Direct and Indirect Costs (N plus O)			$	$	$	$ 90.000

PERSONS PREPARING THIS DOCUMENT:	Name	Title and Address
Host Country:	Dr. B. J. Ndunguru	Head, Dept. Crop Sci, Faculty of Agric., Forestry & Vet. Sci., Univ. of Dar es Salaam, P.O. Box 643, Morogoro, Tanzania
U.S.	Dr. M. J. Silbernagel	see attachment
	Dr. J. M. Due	see attachment

B/C PLANNING OFFICE REPRESENTATIVE Wayne Adams

* Includes foreign travel and training for host country nationals in the U.S.

Country Tanzania
Urbana--Univ. of Illinois

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Institut. U of Ill Urbana	Contrib. from Host Institut.	Requested from Title XII Expended in US U of Ill Urbana	Requested from Title XII *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	24	$ 9,576	$	$	$
b. Co-investigators			$	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$	$
b. Other Professionals			$	$	$	$
c. Graduate Students			$	$	$ 5,000	$
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical	2	11/8.3	$ 1,325	$	$ 1,000	$
f. Technicians			$	$	$	$
TOTAL SALARIES AND WAGES			10,901		6,000	
B. Fringe Benefits (If charged as Direct Cost)@.159			$ 1,761	$	$ 969	$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$ 12,662	$	$ 6,969	$
D. Equipment			$	$	$	$
E. Materials and Supplies			$	$	$	$
F. Travel--1. Domestic (Including Canada, U.S.)						
2. Foreign					6,500	
3. Accompanying Dependents (for long-term assignments)			$	$	$	$
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$ 500	$
K. Computer Costs			$	$	$ 1,000	$
L. All Other Direct Costs			$	$	$ 931	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$	$	$	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs 56% of salaries			$ 7,413	$	$ 4,030	$
P. Total Direct and Indirect Costs (N plus O)			$ 20,075	$	$ 20,000	$

PERSONS PREPARING THIS DOCUMENT:	Name	Title and Address
Host Country:		
U.S.	Dr. Jean M. Due	Professor, Dept. Agric. Econ., Univ. of Illinois
	(Dr. M. J. Silbernagel)	305 Mumford Hall, Urbana, IL 61801

B/C PLANNING OFFICE REPRESENTATIVE . Wayne Adams

* Includes foreign travel and training for host country nationals in the U.S.

Country Tanzania

Prosser -- WSU

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut. WSU USDA Prosser	Contrib. from Host Institut.	Requested from Title XII: Expended in US WSU USDA Prosser	Requested from Title XII: *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	15	$ 5,300	$	$	$
b. Co-investigators			$	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$	$
b. Other Professionals			$	$	$	$
c. Graduate Students			$	$	$	$
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical	1	10	$ 1,100	$	$	$
f. Technicians	2	10/75	$ 1,571	$	$ 7,500	$
TOTAL SALARIES AND WAGES			8,071		7,500	
B. Fringe Benefits (If charged as Direct Cost)		10/8%3	807	$	$ 600	$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$ 8,878	$	$ 8,100	$
D. Equipment, Facilities, & Land use			$ 11,122	$	$	$
E. Materials and Supplies			$ 5,000	$	$ 3,000	$
F. Travel--1. Domestic (Including Canada, U.S.)					600	
2. Foreign					4,500	
3. Accompanying Dependents (for long-term assignments)			$	$	$	$
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$ 148	$
J. Publication Costs/Page Charges			$	$	$ 600	$
K. Computer Costs			$	$	$ 500	$
L. All Other Direct Costs			$	$	$	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$	$	$ 10,248	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) Total Indirect Costs 37% WSU			$	$	$ 6,752	$
P. Total Direct and Indirect Costs (N plus O)			$ 25,000	$	$ 25,000	$

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:		
U.S.	Dr. M. J. Silbernagel	Res. Plant Pathologist, USDA-SEA/AR, WSU-IAREC, P. O. Box 30, Prosser, WA 99350

B/C PLANNING OFFICE REPRESENTATIVE Wayne Adams

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

(Abstract)

MALAWI (Bunda College)

Bunda College of Agriculture, Research team headed by Dr. O.T. Edje

Michigan State University
Drs. M.W. Adams, P. Barnes-McConnell

Virginia State University

TOPIC: Contribution of culture, physical environment, farm practices, local utilization preferences, and plant population biology in the evolution and maintenance of bean land races.

Preferred (by Malawi) Research Items:

1. Establish plant and cultural characteristics essential to acceptance by subsistence farmers.
2. Identify the biological, physical and cultural forces accounting for present patterns of diversity.
3. Determine the role of women in production of beans, seed selection, and group acceptance of particular types for specific uses.
4. Determine the desire for and the definition of "improved" cultivars in a complex rural-village social system.
5. Derive principles to serve as guidelines to the successful introduction and acceptance of an "improved" cultivar.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

DOMINICAN REPUBLIC

I. Proposed Research

A. Topic: Biology, Epidemiology and development and distribution of multiple disease resistant bean seed in the Dominican Republic (Nebraska Contribution)

B. Constraint Area(s) to be Addressed

Rust and bacterial blight diseases along with other diseases cause low and variable productivity (600-800 ky/ha) of beans

C. Description of Proposed Research (production and non-production)

Research will be orientated towards obtaining the necessary data on epidemiology of bean diseases (rust, bacterial blight) that will enable control strategies to be developed for the small farmer. Determine which bacterial blights are important. Screen germplasm (P. vulgaris and other P. germplasm) for resistance to the involved pathogens. Place emphasis on high tolerance/horizontal types of resistance rather than race specific. Determine the inheritance of components of resistance and seek to recombine different components. Transfer resistance into seed and plant types required in the Dominican Republic and also combine resistance identified by us with resistance to other pathogens (web blight, virus, root rots, and angular leaf spot) identified by researchers in Puerto Rico. Transmission of bacteria in seed of tolerant lines will be investigated to select for lower transmission.

D. Anticipated Long-range research goal(s)

To develop disease resistant varieties in order to increase productivity of small bean acreages.

E. First Year Objective(s)

(1) Organize the project (identify and contact personnel; plan and develop training program for students to come to UNI)
(2) Identify bean diseases and initiate germplasm testing for resistance
(3) Make crosses of resistant germplasm with bean types desired in Dominican Republic.

Items (1) and (2) are the same as listed in the Puerto Rico request.

F. Type of Professional Personnel Required

Dominican Republic: Plant Pathologist, Plant Breeder, Sociologist.

University of Nebraska: Plant Breeder (1) Plant Pathologist (2) - a second plant breeder will spend some time on the project.

Country Dominican Republic

II. Potential Collaborators

Host Country - P.I.:	P. Comala (BS)	Plant Breeding	SEA
Co-Investigators:	to be identified	Plant Pathology	
U.S. - P.I.:	Dr. D.P. Coyne	Plant Breeder	Dept. Hort. UN-L. Nebr.
	Dr. M.L. Schuster	Plant Pathologist	" "
	Dr. J.R. Steadman	Plant Pathologist	Dept. Plant Path. UN-L. Nebr.
	Dr. Dale Lindgren	Plant Breeder	North Platte Expt. Stat. Univ. Nebr. North Platt

III. Anticipated Procedures

A. Proposed research site(s):

(1) Dominican Republic (Southwest/North/Central/Regional Agricultural Directorates (SEA)
(2) USA (UN-L, UPR-Mayaguez, Isabela, Adjuntas, Fortuna, and MSU)

B. Proposed research methodology in brief:

(1) Bacterial pathogens causing bean diseases will be identified and characterized.
(2) Mode of survival will be investigated.
(3) Epidemiological studies determining mode of disease dissemination and environmental parameters promoting disease will be initiated.
(4) Germplasm will be screened for resistance to rust and the bacterial pathogens in the field in the Dominican Repub'ic and in controlled tests in Nebraska.
(5) Emphasis will be placed on identifying horizontal resistance in order to obtain more durable resistance.
(6) The components of horizontal resistance will be investigated.
(7) The inheritance of resistance to pathogens will be determined by graduate students using both interspecific and intraspecific crosses.
(8) Resistance will be transferred to desired seed types adapted to the Dominican Republic.
(9) A disease-free program will be incorporated into the breeding program. Effort will be made to select bean genotypes with reduced transmission of the pathogens.

Country Dominican Republic

C. Approximate time schedule over first year:

(1) Making contact with personnel in Dominican Republic and Puerto Rico - (first month)
(2) Disease and site identification - (first month)
(3) Determination of students for UN-L training - 6 months
(4) Epidemiology Studies - 6 months
(5) Isolation and characterization of bacterial pathogens - 6 months
(6) Screening resistant germplasm - all of first year
(7) Start hybridization - 6-12 months

D. Division of labor:

1. Anticipated responsibilities of host country researchers:

1. Setup and maintain field plots to screen for resistance.
2. Help in evaluating reactions of germplasm in field plots.
3. Identify researchers for UN-L training (MS, Ph.D.)

2. Anticipated responsibilities of U.S. reseachers:

1. Train graduate students (MS, Ph.D.)
2. On site determination of diseases and research sites
3. Advise on and conduct epidemiology studies and appropriate control strategies
4. Isolate and identify causal bacteria of diseases, determine variability, determine sources of primary inoculum
5. Screen germplasm for resistance, conduct genetic analysis of resistance and incorporate resistance into desired bean types in cooperation with researchers from Puerto Rico who will work with other pathogens

IV. Training Component (indicate number, levels and sites)

(1) Two graduate students (Ph.D. level) - breeding and genetics of resistance to bacteria and rust pathogens
(2) One graduate student - epidemiology and characterization of bacteria (Ph.D. level). These graduate students would conduct their academic programs at the University of Nebraska, Lincoln Campus, NE and could conduct their research program in the Dominican Republic (or part of research at Lincoln)

Country Dominican Republic

V. Estimated Budget for First Year

NOTE: $45,000 included in the budget submitted by Puerto Rico was for cooperative research

	No.	Time % on CRSP	Proposed Budget Estimate with Univ. Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII Expended in US	Requested from Title XII *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	20	$ 6,800	$	$	$
b. Co-investigators	2	20	$ 11,800	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	1	10	$ 2,100	$	$	$
b. Other Professionals			$	$	$	$
c. Graduate Students	3	100	$	$	$	$ 21,000
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical	1	20	$	$	$ 2,000	$
f. Technicians	1	50	$	$	$ 6,500	$
TOTAL SALARIES AND WAGES			20,700			21,000
B. Fringe Benefits (if charged as Direct Costs			$ 2,691	$	$ 1,105	$ 1,470
C. Total Salaries, Wages, and Fringe Benefits (A & B)			$ 23,391	$	$ 9,605	$ 22,470
D. Equipment			$	$	$	$
E. Materials and Supplies			$	$	$ 2,000	$ 2,000
F. Travel--1. Domestic (including Canada, U.S.) 2. Foreign 3. Accompanying Dependents (for long-term assignments)			$	$	$ 1,700	$ 8,900
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$	$
K. Computer Costs			$	$	$ 300	$
L. All Other Direct Costs			$	$	$	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$ 23,391	$	$ 13,905	$ 33,370
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) Total Indirect Costs			$	$	$ 8,107	$ 19,455
P. Total Direct and Indirect Costs (N plus O)			$ 23,391	$	$ 22,012	$ 52,825

PERSONS PREPARING THIS DOCUMENT:

GRAND TOTAL AMOUNT = $98,228

	Name	Title and Address
Host Country:	Agro. Guillermo Contreras	SEA. St. Domingo, D.R.
	Agro. Raul Pineda	SEA. St. Domingo, D.R.
	Dr. Antonio Pinchinat	IICA St. Domingo, D.R.
U.S.	Dr. J. Montaya	Professor, Dept. Hort., Univ. of Nebraska
	D.P. Coyne	Professor, Dept. Hort., Univ. of Nebraska
	M.L. Schuster	Professor, Dept. Hort., Univ. of Nebraska
	J.R. Steadman	Professor, Dept. Plant Pathology, UNL

B/C PLANNING OFFICE REPRESENTATIVE

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

DOMINICAN REPUBLIC

I. Proposed Research

A Topic:

Development and distribution of multiple disease resistant bean seed in the Dominican Republic.

B. Constraint Area(s) to be Addressed:

1. Low and variable productivity (600-800 kg/ha) due to diseases (rust, root rots, bacterial blights, viruses, angular leaf spot, anthracnose, web-blight).

2. Production systems (lack of technical information, low capital to acquire technological inputs, plant architecture adjusted to specific cropping systems, production economics, and functions).

3. Production and distribution of high quality basic seed (infrastructure, laboratory equipment and techniques, linkages between research and extension).

C. Description of Proposed Research (Production and Non-Production):

The project will assemble a research staff and support personnel with the capability of investigating the role diseases play in the various farming systems in the principal production areas. Available sources of resistance will be introduced and tested in the Dominican Republic to determine their applicability to stabilize and increase bean yields. Appropriate sources of resistance will be introduced into the breeding program to transfer such resistance to preferred standard Dominican bean types. Breeding for improved mutliple disease resistance will be continued at the University of Puerto Rico and MITA. The University of Nebraska will collaborate in investigating sources of resistance from other Phaseolus species germ plasm. A complementary program will be developed to determine the seed-transmitted pathogens', role in reducing bean yields in the present farming systems. Clean seed of preferred standard varieties and new improved disease resistant cultivars will be entered into the first stage of a seed multiplication and distribution program to provide a source of basic seed.

D. Anticipated Long-Range Research Goal(s):

1. Increase and stabilize yield and production of preferred bean cultivars.

2. Establish and sustain in-country technical and research capability to accomplish the objectives of the project.

E. First Year Objective(s):

1. Organize the project (identify and contract personnel; plan and develop training program).

2. Study (diagnose) farming systems.

3. Identify bean diseases and initiate germ plasm testing for resistance.

4. Evaluate (drill box survey) quality of seed used by farmers.

5. Organize and set-up seed laboratory and analyses systems.

6. Organize basic seed production scheme.

F. Type of Professional Personnel Required:

1. Dominican Republic

1.1. Project co-investigator (plant breeder)
1.2. Phytopathologist
1.3. Agricultural economist (farm management)
1.4. Seed technologist
1.5. Cropping systems specialist (zoning and soils)
1.6. Sociologist (consultant)

2. Univ. of Puerto Rico, Michigan State Univ. and Univ. of Nebraska

2.1. Phytopathologist/Disease resistance
2.2. Phytopathologist/Seed quality
2.3. Plant breeder/Disease resistance
2.4. Agronomist/General
2.5. Phytopathologist/Laboratory and Greenhouse
2.6. Plant breeder/Pathologist (bacterial blight)
2.7. Phytophysiologist (consultant)

II. Potential Collaborators

		Researcher	Discipline	Prof. Address
1. Dom. Rep. P.I.:	1.1.	P. Comala, B.S.	Plant Breeding	SEA
Co-Investigators:	1.2.	_____, M.S.	Phytopathology	
	1.3.	_____, M.S.	Ag. Economics	
	1.4.	A. Núñez , M.S.	Seed Technology	
	1.5.	R. Boris , M.S.	Crop Systems/Agron.	
	1.6.	_____, Ph.D.	Sociology (consult.)	
	1.7.	_____, Ph.D.	Physiology (consult.)	
2. U.S.	2.1.	J.H. López-Rosa, Ph.D.	Phytopathology	UPR
	2.2.	A.F. Saettler , Ph.D.	Phytopathology	MSU
	2.3.	G.F. Freytag , Ph.D.	Breeding	MITA
	2.4.	R. Echávez , M.S.	Agronomy	UPR
	2.5.	M. Zapata , B.S.	Phytopathology	UPR
	2.6.	D. Coyne , Ph.D.	Breeding	UN

III. Anticipated Procedures

A. Proposed Research Site(s):

1. Dominican Republic (Southwest/North/Central/Regional Agricultural Directorates (SEA).

2. US (UPR-Mayaguez, Isabela, Adjuntas, Fortuna; MSU; UN).

B. Proposed Research Methodology in Brief:

1. Screen, identify and breed for multiple disease resistance in Puerto Rico.

2. Survey socio-economic factors of the principal farming systems of the major Dominican bean production areas.

3. Evaluate multiple disease resistant sources in the principal farming systems in the Dominican Republic.

4. Breed by backcross multiple disease resistance into preferred Dominican cultivars.

5. Select progenies in the Dominican Republic.

6. Increase, select for uniformity and yield test in multiple locations.

7. Perform combined analysis of data to guide the breeding program.

8. Survey available seed in major production areas for seed-borne pathogens and quality.

9. Determine limiting factors for quality seed production and develop a program to solve such problems.

10. Provide and release seed of improved bean cultivars.

C. Approximate Time Schedule Over First Year:

1.	Planning	January-March
2.	Staffing and procurement	January-April
3.	Training	March-December
4.	Evaluation of farming systems	April-December
5.	Testing	May-December
6.	Breeding and screening	January-December

D. Division of Labor:

1. Anticipated responsibilities of Dominican Republic researchers:

1.1. Participate in planning and programming of research activities.
1.2. Conduct and supervise research activities.
1.3. Jointly evaluate research results.
1.4. Transfer research results.
1.5. Plan and participate in training programs.

2. Anticipated responsibilities of U.S. researchers:

2.1. Joint planning and programming of research activities.
2.2. Conduct and guide research activities.
2.3. Provide training in needed areas.
2.4. Jointly evaluate research results.

IV. Training Component (Number, Levels and Sites):

1. Continuing diagnosis of training needs.

2. Discipline	Number	Level	Site
2.1. Breeding	2-3	MS/PhD	UPR, MSU, UN
2.2. Seed Technology	1	MS	Cornell, Miss.
2.3. Phytopathology	2	MS/PhD	UPR, MSU, UN, Cornell, Calif.
2.4. Ag. Economics (Production)	1	PhD	MSU, Texas A&M
2.5. Farming Systems	1	MS	Cornell, Florida
3. In-country training (non-degree)			
3.1. Socio-economic survey	3		DR, UPR
3.2. Field management	12		DR, UPR

4. Specialized in-service post-graduate training (non-degree)

4.1. Breeding 4.2. Phytopathology 4.3. Physiology 4.4. Biometry	According to needs

Country Dominican Republic

V. Estimated Budget for First Year

	No.	Time % on CRSP person years	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	.50	$	$	$ 14,100	$
b. Co-investigators	2	1.20	$	$	$ (6,000)[a]	$ 18,000
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$ -0-	$ -0-
b. Other Professionals	7	6.08	$	$	$ 22,300	$ 47,700
c. Graduate Students	3	3.00	$	$	$	$ 15,000
d. Laborers	8	8.00	$	$	$ 10,000	$ [illegible]
e. Secretarial-Clerical	3	3.00	$	$	$ 7,560	$ [illegible]
f. Technicians	7	7.00	$	$	$ 15,000	$ 15,000
TOTAL SALARIES AND WAGES					69,460	112,200
B. Fringe Benefits (if charged as Direct Costs			$	$	$ 10,410	$
C. Total Salaries, Wages, and Fringe Benefit. (A + B)			$	$	$ 79,870	$
D. Equipment			$	$	$ 2,000	$ 26,000
E. Materials and Supplies			$	$	$ 2,000	$ 10,000
F. Travel--1. Domestic (including Canada, U.S.)					1,600	6,000
2. Foreign					400	6,000
3. Accompanying Dependents (for long-term assignments)			$	$	$ -0-	$ -0-
G. Shipment and Storage of Household Goods			$	$	$ -0-	$ -0-
H. Housing Allowances			$	$	$ -0-	$ -0-
I. Orientation and Medical Expenses			$	$	$ -0-	$ -0-
J. Publication Costs/Page Charges			$	$	$ 1,000	$ 2,000
K. Computer Costs			$	$	$ 2,000	$ -0-
L. All Other Direct Costs (Equip. + Repairs, Communications, etc.			$	$	$ 2,000	$ 4,000
M. Training Costs			$	$	$ 500	$ 3,000
N. Total Direct Costs (C through M)			$	$	$ 91,370	$ 151,200
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)			20,982[c]			
Total Indirect Costs (at 60% of 69460 on campus rate for work in U.S.			$ 41,676	$	$	$ 15,708[b]
P. Total Direct and Indirect Costs (N plus O)			$	$	$ 91,370	$ 134,908

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	Agro. Guillermo Contreras	SEA, Sta. Domingo, D.R.
	Agro. Raul Pirieda	SEA, Sta. Domingo, D.R.
	Dr. Antonio Pinchinat	IICA, " " "
	Dr. Horacio Stagno	IICA, " " "
	Dr. Jorge Montoya	IICA, " " "
U.S.	Dr. George Freytag	MITA, Mayaguez, P.R.
	Dr. Julio H. Lopez-Rosa	UPR, Mayaguez Campus, P.R.

B/C PLANNING OFFICE REPRESENTATIVE Drs. Freytag and Lopez-Rosa (designates)

* Includes foreign travel and training for host country nationals in the U.S.
a. Contributed by U.S. Dept. of Agriculture at no charge to project. b. Indirect cost @ 14% of 112,200. c. Off-campus G & A rate of 20% x 104,908.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

HONDURAS

I. Proposed Research

A. Topic: Increase and stabilization of Honduran bean production through disease resistance

B. Constraint Area(s) to be Addressed

Low and variable bean productivity due, in part, to diseases

C. Description of Proposed Research (production and non-production)

The project will assemble a research staff and support personnel with the capability of investigating the role diseases play in the various farming systems in the principal Honduran bean production areas. Available sources of resistance will be introduced and tested in Honduras to determine their applicability to stabilize and increase bean yields. Appropriate sources of resistance will be introduced into the breeding program to transfer such resistance to preferred standard Honduran bean types. Breeding for improved multiple disease resistance will be continued in Puerto Rico and incorporated into the Hounduran effort at the Escuela Agricola Panamericana. The project will provide a basic seed stock of improved preferred standard Honduran bean cultivars for multiplication and distribution.

D. Anticipated Long-range research goal(s)

Increase and maintain stable production of preferred Honduran bean cultivars

E. First Year Objective(s)

(1) Study farming systems for the preferred Honduran bean types in the major production areas.
(2) Evaluate available multiple disease resistant germ plasm under Honduran conditions.
(3) Initiate transfer of multiple disease resistance to preferred Honduran bean cultivars.

F. Type of Professional Personnel Required

Economist-sociologist, pathologists, agronomists, breeders

Country Honduras

II. Potential Collaborators

	Researchers	Discipline	Professional Address
Host Country - P.I.:	P.E. Paz	Breeder	EAP
Co-Investigators:	M. Contreras	Phytopathologist	SRN
	L.O. Tercero	Agronomist	SRN
U.S. - P.I.:	J.H. Lopez-Rosa	Phytopathologist	AES-UPR
	G.F. Freytag	Breeder	MITA
	Mildred Zapata	Phytopathologist	AES-UPR
	R. Echavez	Agronomist	AES-UPR

III. Anticipated Procedures

A. Proposed research site(s):

a. Puerto Rico - 4 locations
b. Honduras
   (a) Zamorano (EAP)
   (b) Danli (El Paraiso)
   (c) Catacamas (Olancho)
   (d) Valle de Siria

Three farming types in each of these localities.

B. Proposed research methodology in brief:

1. Screen, identify and breed for multiple disease resistance in Puerto Rico.
2. Evaluate multiple disease resistant advanced bean lines in the principal farming systems in the major Honduran bean areas.
3. Transfer multiple disease resistance from Puerto Rico advanced lines into preferred Honduran cultivars.
4. Evaluate and select progenies in Honduras and Puerto Rico.
5. Increase and select for uniformity, and yield test in multiple locations.
6. Perform combined analysis of data to guide breeding effort to accomplish project's goals.
7. Provide a basic seed stock of improved preferred Honduran bean cultivars for multiplication and distribution.

C. Approximate time schedule over first year:

1. Continuous breeding in Puerto Rico for higher levels of multiple disease resistance - Jan.-Dec.
2. Organization of program. Training. Contacts with various type of farmers. Survey of practices and cropping systems - Jan.-May.
3. Evaluation in Honduras of multiple disease resistance in two planting seasons - June-Dec.
4. Selection of donor germ plasm for conversion of Honduran cultivars Nov.-Dec.

Country Honduras

D. Divison of Labor:

1. Anticipated responsibilities of host country researchers:
   (a) Participate in planning of project and in evaluation of research results.
   (b) Coordinate and supervise research activities.
   (c) Establish an agronomist in each locality in Honduras.
   (d) Carry out field research activities.
   (e) Breed and evaluate profenies for conversion program.
   (f) Increase released materials for distribution.

2. Anticipated responsibilities of U.S. researchers:
   (a) Carry out planning of project and evaluate research results.
   (b) Provide training in specialized areas.
   (c) Breed and provide basic multiple disease resistant germ plasm.
   (d) Participate in testing selected materials.
   (e) Global evaluation of results and preparation of reports.

IV. Training Component (indicate number, levels and sites)

A. Graduate training, at the MS/PhD level, in U.S. universities for two Honduran nationals, one in phytopathology and one in breeding.
B. In-service training (field plot technique, pathology, breeding) in Honduras & Puerto Rico for four Honduran agronomists.
C. Specialized in-service, post-graduate (non-degree) training for Project staff as needed.

Country Honduras

V. Estimated Budget for First Year

	No.	Time % on CRSP person years	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	0.25	$	$	$ 7,050	$
b. Co-investigators	3	0.40	$	$	$ (6,000) [1]	$ 10,200
2. Other Personnel (Non-Faculty)						
a. Research Associate-Postdoc			$	$	$ -0-	$ -0-
b. Other Professionals	4	1.25	$	$	$ 11,400	$ 2,520
c. Graduate Students			$	$	$ -0-	$ -0-
d. Laborers	4	4.00	$	$	$ 12,000	$ 3,600
e. Secretarial-Clerical	2	2.00	$	$	$ 7,560	$ 2,520
f. Technicians	5	5.00	$	$	$ 10,200	$ 12,000
TOTAL SALARIES AND WAGES					46,310	30,240
B. Fringe Benefits (if charged as direct costs)		15%	$	$	$ 6,301	$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$	$	$ 52,911	$
D. Equipment			$	$	$ 1,000	$ 1,200
E. Materials and Supplies			$	$	$ 1,000	$ 1,020
F. Travel--1. Domestic (Including Canada, U.S.)					1,700	
2. Foreign					1,000	9,000
3. Accompanying Dependents (for long-term assignment)			$	$	$ -0-	$ -0-
G. Shipment and Storage of Household Goods			$	$	$ -0-	$ -0-
H. Housing Allowances			$	$	$ -0-	$ -0-
I. Orientation and Medical Expenses			$	$	$ -0-	$ -0-
J. Publication Costs/Page Charges			$	$	$ 1,200	$ 1,200
K. Computer Costs			$	$	$ 2,300	$ -0-
L. All Other Direct Costs (equip., communications, etc.)			$	$	$ 1,000	$ 1,020
M. Training Costs			$	$	$ 500	$ 500
N. Total Direct Costs (A through M)			$	$	$ 62,111	$ 57,738
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus base in remarks)			11,598 [d]			
Total Indirect Costs (at 30% of 52,911 on campus rate for work in US)			$ 31,746	$	$ -0-	$ 7,248 [c]
P. Total Direct and Indirect Costs (N plus O)			$ 43,344	$	$ 62,111	$ 57,738

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	Dr. Simon Malo	Director, E.A.P., Tegucigalpa
	Dr. Pablo E. Paz	Director, Plan Sciences, E.A.P., Tegucigalpa
U.S.	Dr. George F. Freytag	MIRA, Mayaguez, Puerto Rico
	Dr. Julia Lopez-Rosa	IIPR, Mayaguez Campus, Puerto Rico

B/C PLANNING OFFICE REPRESENTATIVE

* Includes foreign travel and training for host country nationals in the U.S.
a) contributed by U.S. Dept. of Agriculture at no charge to project. b) land rental and preparation. c) indirect cost at 20% of $36,240. d) off-campus G & A ? 20% of $57,990.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

INCAP (Guatemala)

I. Proposed Research

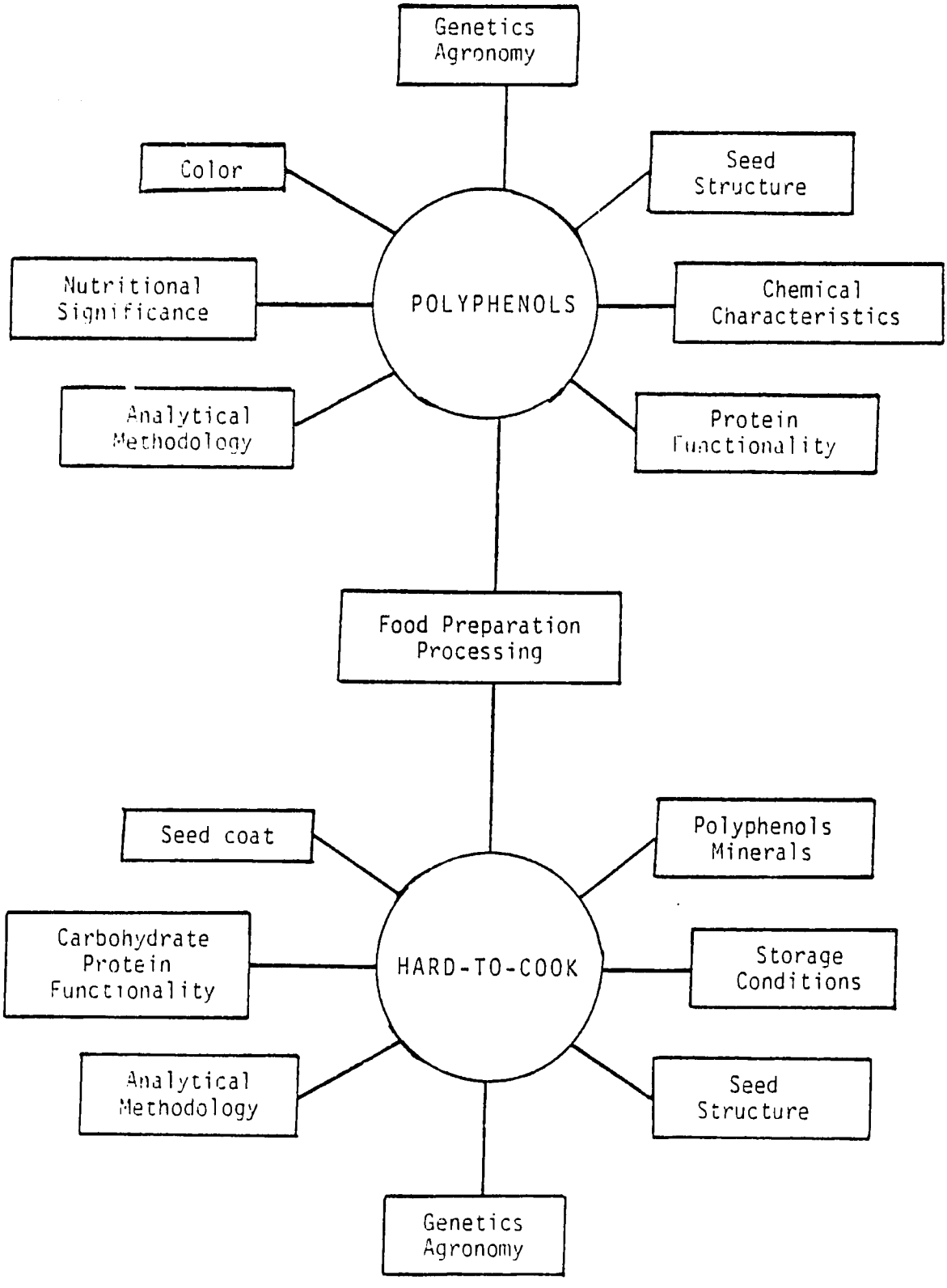
A. Topic: Improved biological utilization and availability of dry beans.

B. Constraint area(s) to be addressed: Nutrition, Food Preparation & Health; Storage and Commodity Maintenance.

C. Description of proposed research: The proposed research is primarily directed to the question of the effect of polyphenols, and other anti-nutritional factors, on bean protein digestability; however, other factors that constrain the availability and consumption of dry beans, such as storage and consumer acceptance will also be appraised. The proposed research areas comprise the development of analytical methodology for the characterization of polyphenols in beans and biological materials, the determination of the role of polyphenols and minerals on the development of the hard-to-cook phenomenon, the biodeterioration, the functional properties of beans and the acceptability and the assessment of the nutritional significance of the types of polyphenols on bean protein quality and digestibility in animals and human beings. All the studies will be carried out using beans of different colors and preparation techniques.

The research endeavors will establish genetic and technological alternatives for the improvement of the nutritional and storage quality of beans, as well as suggesting alternatives for the utilization of hard-to-cook beans.

D. Anticipated long-range research goals: Improved utilization and availability of beans for human consumption through genetic, nutritional and technological


Genetics
Agronomy
Color
Seed
Structure
Nutritional
Significance
POLYPHENOLS
Chemical
Characteristics
Analytical
Methodology
Protein
Functionality
Food Preparation
Processing
Seed coat
Polyphenols
Minerals
Carbohydrate
Protein
Functionality
HARD-TO-COOK
Storage
Conditions
Analytical
Methodology
Seed
Structure
Genetics
Agronomy

interventions.

E. First year objective(s):

1. To develop analytical methodology for the characterization of polyphenols of dry beans of different colors.
2. To determine the role of total and relative divalent, sodium and potassium ions concentration in beans of different colors on the development of the hard-to-cook phenomenan and the physical-chemical changes in the protein and carbohydrates during storage.
3. To study the effect of seed coat color on the digestibility of bean protein "in vitro" and "in vivo" using animals and human beings.

F. Type of Professional Personnel Required:

Technicians, Graduate and Undergraduate University Students.

. Potential Collaborators:

	Researchers	Disciplines	Professional Address
Host Country - P.I.	R. Bressani	Biochem-Nutr.	INCAP, Guate
Co-Investigators:	E. Braham	Biochem-An Nutr	INCAP, Guate
	L. G. Elias	Food Sci-Nutr.	INCAP, Guate
	M. Molina	Food Sci-Nutr.	INCAP, Guate
	R. Gomes Brenes	Biochem-Nutr.	INCAP, Guate
United States - P.I.	B. G. Swanson	Food Sci-Nutr.	INCAP, Guate
Co-Investigators:	E. Varriano-Marsten	Food Sci	Kansas State Univ.
	D. R. Wood	Agron-Gen	Colorado St Univ.
	G. Hosfield	Food Sci-Agron	Michigan St. Univ.
	G. Freitag	Agron-Gen	USDA, Puerto Rico
	J. Lopez-Rosa	Agron-Gen	Univ. Puerto Rico

III. Anticipated procedures

A. Proposed research site(s):

Institute of Nutrition of Central America and Panama (INCAP),
Guatemala, Guatemala, C. A.

Washington State University
Pullman, WA. 99164

Kansas State University
Manhatten, KS.

Colorado State University
Fort Collins, CO.

Michigan State University
East Lansing, MI. 48824

University of Puerto Rico
Rio Piedras, Puerto Rico 00928

B. Proposed research methodology in brief:

Objective 1. Assay of polyphenols with paper, thin layer (TLC), column, gas-liquid (GLC) and high performance liquid (HPLC) chromatography and electrophoresis.

Objective 2. Mineral analysis by atomic absorption, bean hardness determination by puncture tests, physico-chemical characterization of starch and protein fractions by viscosity, absorption, desorption, solubility pattern, electronic microscopy, degree of gelatinization, gelatinization curves and bound minerals.

Objective 3. Protein quality of beans. Chemical: nitrogen and amino acid analysis. Biological: in animals, through nitrogen efficiency ratio (NER) and digestibility determinations; in humans, by the Nitrogen Balance Index Method; and *in vitro*, protein digestibility by the enzymatic method on bean cultivars selected for specific characteristics such as high poly-

phenolic or high protein concentration.

C. Approximate time schedule over first year:

Objective 1. Evaluation of chromatography (paper, TLC, and column) (3 months).

Electrophoresis (paper, TLE and gel) (3 months).

Combined methodologies (5 months).

Selected methodology in different varieties of beans (1 month).

Objective 2.

a. Collection, analysis and preparation of samples (3 months).

b. Storage under controlled temperature and relative humidity conditions and different dry bean moisture concentrations. (6 months).

c. Analysis of the samples at different storage times (3 and 6 months).

d. Analysis of data and preparation of report (1 month).

Objective 3.

a. Collecti n and analysis of samples (2 months).

b. Animal biological assays (4 months).

c. Human biological assay (6 months).

d. In vitro digestibility assays (2 months)

e. Analysis of data and preparation of report (2 months).

D. Division of labor:

1. Anticipated responsibilities of host country researchers:

a. Collection and distribution of experimental materials.

b. To carry out the proposed analysis with the equipment available, to implement all biological assays, to collect and analyze the data, to prepare progress and final reports as well as the pertinent scientific publications.

c. To select and train local and foreign students.

d. To attend meetings with U.S. counterparts, when necessary.

e. To suggest future research avenues, according to the results obtained.

2. Anticipated responsibilities of U. S. researchers:

Washington State University

Coordinate nutritional and technological research studies of dry beans; and

1. In cooperation with INCAP, carry out in vitro digestibility studies to determine chemical responses of polyphenols and proteins to soaking, heating and digestion.
2. In cooperation with INCAP, the University of Puerto Rico and Michigan State University, apply high performance liquid chromatography (HPLC) to the separation and identification of polyphenolic compounds in dry beans of various colors.
3. In cooperation with INCAP and Kansas State University, investigate the nature of carbohydrates and structure of "hard-to-cook" dry beans by electron microscopy.

Kansas State University

In cooperation with INCAP and Washington State University, identify the physical and chemical changes that occur during storage of dry beans; identify the contributions of seed coat and cotyledon to the "hard-to-cook" development by utilizing autoradiography to study water absorption and the Instron to measure "cooking time"; and determine localization of minerals in dry beans using X-ray energy dispersive analyses.

University of Puerto Rico

In cooperation with INCAP and Washington State University, extract, isolate and identify polyphenolic compounds in dry beans of different colors.

Colorado State University

In cooperation with INCAP and Washington State University, collaborate in

identifying and improving the nutritional quality and availability of dry bean proteins.

Michigan State University

In cooperation with INCAP, University of Puerto Rico, Kansas State University and Washington State University initiate a breeding program to identify and improve the susceptibility of dry beans to water penetration and softening during cooking; and identify explicitly the genetics associated with production of groups of polyphenolic compounds found in dry beans.

V. Estimated Budget for First Year

A. Host Country Institution

	No.	% Time	Expenditure
1. Salaries and Wages			
a. P. I.	1	25	11,000
b. co-investigators	3	33	41,500
c. technicians	2	50	7,500
			60,000
2. Materials and Supplies			
a. chemical supplies			15,000
b. feeding supplies			15,000
			30,000
3. Travel			
a. 3 visits (one person/visit) to USA			5,500
4. Training costs			
a. student at INCAP			4,000
5. Common services (25% direct)			25,000
6. Indirect (31.5% negotiable with PAHO)			(39,375)
TOTAL			124,500

PERSONS PREPARING THIS DOCUMENT:

Host Country: Name:	Title & Address:
Ricardo Bressani	Chief, Division Agricultural & Food Science
Edgar Braham	Assistant Chief, Division Agricultural & Food Science
R. Gomez Brenes	Scientist, Same Division
M. R. Molina	Scientist, Same Division
L. G. Elias	Scientist, Same Division

B. United States Institutions

Budget Totals

Washington State University	25% Matching	U.S. Aid
Salaries & Wages (25% P.I.)	7,500	10,000
Supplies	875	4,000
Travel	-	2,500
Indirect (42%)	6,720	-
	15,095	16,500
Kansas State University		
Salaries & Wages (20% P.I.)	4,500	6,500
Supplies	600	3,000
Indirect (49.3%)	4,165	-
	9,265	9,500
University of Puerto Rico		
Salaries & Wages		6,500
Supplies		1,500
Indirect (50%)	4,000	-
	4,000	8,000
Colorado State University		
Salaries & Wages		6,500
Supplies		1,000
Indirect		-
		7,500
Michigan State University		
Salaries & Wages		6,500
Supplies		2,000
Indirect		-
		8,500
		$50,000

Country GUATEMALA

Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Ho Country
Salaries and Wages						
1. Senior Personnel						
a. P.I.	2	25%	$ 7,500	$	$	$ 11,000
b. Co-investigators	8	10-33%	$ 20,500	$	$	$ 41,500
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$	$
b. Other Professionals			$	$	$	$
c. Graduate Students	4	50%	$	$	$ 26,000	$
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical			$	$	$	$
f. Technicians	3	50-100%	$	$	$ 10,000	$ 7,500
TOTAL SALARIES AND WAGES						
Fringe Benefits (if charged as Direct Costs)		10%	$ 2,800	$	$ 3,600	$ xxxx
Total Salaries, Wages, and Fringe Benefits (A + B)			$ 30,800	$	$ 39,600	$ 60,000
Equipment			$	$	$	$
Materials and Supplies			$ 3,000	$	$ 11,500	$ 30,000
Travel--1. Domestic (Including Canada, U.S.)						
2. Foreign					2,000	6,000
3. Accompanying Dependents (for long-term assignments)			$	$	$	$
Shipment and Storage of Household Goods			$	$	$	$
Housing Allowances			$	$	$	$
Orientation and Medical Expenses			$	$	$	$
Publication Costs/Page Charges			$	$	$	$
Computer Costs			$	$	$	$
All Other Direct Costs Common Services 25%			$	$	$	$ 25,000
Training Costs			$	$	$	$ 4,000
Total Direct Costs (C through M)			$ 33,800	$	$ 53,100	$
Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs		(31.5%)	$ 17,000	$	$ xxxx	$ (39,375)
Total Direct and Indirect Costs (N plus O)			$ 50,800	$	$ 53,100	$ 164,375

SONS PREPARING
DOCUMENT:

Name	Title and Address
t Country: L. G. Elias	Scientist, INCAP
E. Braham	INCAP
B. G. Swanson	Washington State University

PLANNING OFFICE REPRESENTATIVE Adams

Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

GUATEMALA

I. Proposed Research

A. Topic:

BIOLOGICAL - Adaptation of beans (Effects of daylength and temperature upon yield, adaptation and stability).

SOCIOLOGICAL - Development of methodology to measure impact of new technology in bean production.

B. Constrant Area(s) to be Addressed

BIOLOGICAL - Wide vs. narrow (specific) adaptation of beans

C. Description of Proposed Research (production and non-production)

SOCIOLOGICAL - 1. Work with ICTA personnel and Title XII graduate students to develop agro/socio/economic questionnaires, apply them in the field (Chimaltenango and Jutiapa) and develop data, storage and analysis capabilities.
2. Identify agronomic constraints on bean production and study the role of beans in the farming systems.
3. Evaluate new technology for bean production on small farms.

Broad objectives: 1. To develop valid methods of judging the merit of a potentially useful production practice when the evaluations are carried out, not on the experiment station but under the conditions of ultimate use such as on the small farm and under the management system prevailing thereon. 2. To develop a credible system for estimating the degree of small farm acceptance of a given production practice, and to provide through agronomic and socio-cultural feedback a means of determining causes for acceptance or non-acceptance.

Overall objective: To determine the biological, economic and social role of beans in the farming system of small farms, and to determine how these factors modify the production and use of beans.

D. Anticipated Long-range research goal(s)

BIOLOGICAL - To improve the efficiency of breeding for wide adaptation or narrow (specific) adaptation. To acquire understanding of the components of adaptation and stability.

Country Guatemala

SOCIOLOGICAL - To have developed a refined methodology for research evaluation of new bean production in small farmers context and training of ICTA personnel to carry on the work themselves.

E. First Year Objective(s)

SOCIOLOGICAL - Choose participants, begin questionnaire construction, and select field sites.

F. Type of Professional Personnel Required

BIOLOGICAL - Graduate students

SOCIOLOGICAL - Graduate students, professional of ICTA, U.S. University professionals

II. Potential Collaborators

B I O L O G I C A L

	Researchers	Discipline	Professional Address
Host Country - P.I.:	P. Masaya	Breeder/Physiologist	ICTA
Co-Investigators:			
U.S. -P.I.:	D.H. Wallace	Breeder/Physiologist	Cornell Univ., Ithaca, N.Y.
Co-Investigators:			

S O C I O L O G I C A L

	Researchers	Discipline	Professional Address
Host Country - P.I.:	Selvin Arriaga	Economist	ICTA
Co-Investigators:	Marco A. Martinez	Agronomy	ICTA
	Sandra Calderon	Agronomy	ICTA
	Essau Somoyoa	Economics	ICTA
U.S. - P.I.:	Chris Wien	Veg. Crops	Cornell
Co-Investigators:	Roger Sandsted	Veg. Crops	Cornell
	Patricia Garrett	Rural Sociology	Cornell

Country Guatemala

III. Anticipated Procedures

A. Proposed research site(s):

BIOLOGICAL - Chimaltenango 1786 meters
Jutiapa 0 to 900 meters
Quezaltenango 2400 meters

SOCIOLOGICAL - Villages in Chimaltenango province (highland plateau)
Villages in Jutiapa province (eastern lowlands)

B. Proposed research methodology in brief:

BIOLOGICAL - Data will be collected on: days to flowering, concentration of flowering, days to maturity, no. branches, no. nodes, no. pods, location of pods on plant, location of flowers, seeds/pods, avg. seed weight, seed yield, biological yield, duration of leaf foliage, harvest index.

SOCIOLOGICAL - Use questionnaires, field visits, test plots with the agronomic constraints

C. Approximate time schedule over first years:

SOCIOLOGICAL - To be worked out as research site is specified.

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:

BIOLOGICAL - Field evaluation in high, medium and low elevation under bean growing conditions that make the data meaningful for the small farmer conditions. This may, if possible, be contrasted with a monoculture system.

SOCIOLOGICAL - Supervise field work of students, participate in discussions and general operation of project.

2. Anticipated responsibilities of U.S. researchers:

BIOLOGICAL - Controlled environment studies of daylength and temperature effects on bean lines with known (or partly known) adaptation to low or high growing temperatures - lines that are insensitive, moderately sensitive or very sensitive to daylength, lines with wide and narrow adaptability, etc.

SOCIOLOGICAL - Assist in bringing the project to reality in all ways possible - data management, etc.

Country Guatemala

IV. Training Component (indicate number, levels and sites)

BIOLOGICAL - All work to be done through MS (mostly) and Ph.D. candidates

SOCIOLOGICAL - 4 graduate students (mix of Latin American and U.S.)

Country Guatemala

V. Estimated Budget for First Year

B I O L O G I C A L

	No.	Time % on CRSP	Proposed Budget Estimate — Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII — Expended in US	Requested from Title XII — *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	___	___	$ 10,000	$	$	$
b. Co-investigators	___	___	$	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	___	___	$	$	$	$
b. Other Professionals	___	___	$	$	$	$
c. Graduate Students	1	___	$	$	$	$ 10,000
d. Pre-Baccalaureate Students	___	___	$	$	$	$
e. Secretarial-Clerical	___	___	$	$	$	$
f. Technicians	___	___	$	$	$	$
TOTAL SALARIES AND WAGES			$	$	$	$
B. Fringe Benefits (if charged as Direct Costs)			$	$	$ 10,000	$
C. Total Salaries, Wages, and Fringe Benefits (A+B)			$	$	$	$
D. Equipment			$	$	$	$
E. Materials and Supplies			$	$	$	$ 10,000
F. Travel - 1. Domestic (including Canada, U.S.)						
2. Foreign						
3. Accompanying Dependents (for long-term assignments			$	$	$	$
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$	$
K. Computer Costs			$	$	$	$
L. All Other Direct Costs			$	$	$	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$	$	$	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs			$	$	$	$
P. Total Direct and Indirect Costs (N + O)			$	$	$	$

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	P. Masaya	Bean Program Coordinator
		5a Ave. 12-31 zona 9 Guatemala City, Guatemala
U.S.	Donald H. Wallace	Professor of Vegetable Crops & Plant Breeding

S/C PLANNING OFFICE REPRESENTATIVE M.W. Adams

*Includes foreign travel and training for host country nationals in the U.S.

Country Guatemala

V. Estimated Budget for First Year

S O C I O L O G I C A L

Total Budget - including adaptation

	No.	Time % on CRSP	Proposed Budget Estimate			
			Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII	
					Expended in US	Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	___	___	$ 45,000	$	$	$
b. Co-investigators	___	___	$	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	___	___	$	$	$	$
b. Other Professionals	___	___	$	$	$	$
c. Graduate Students	4	___	$	$	$	$ 21,000
d. Pre-Baccalaureate Students	___	___	$	$	$	$
e. Secretarial-Clerical	___	___	$	$	$	$
f. Technicians - programmer	___	___	$	$	$ 7,500	$
TOTAL SALARIES AND WAGES			$	$	$	$
B. Fringe Benefits (if charged as Direct Costs			$	$	$ 2,500	$
C. Total Salaries, Wages, and Fringe Benefits (A+B)			$	$	$	$
D. Equipment			$	$	$	$
E. Materials and Supplies			$	$	$	$
F. Travel - 1. Domestic (including Canada, U.S.)						
2. Foreign						
3. Accompanying Dependents (for long-term assignments			$	$	$ 30,000	$ 40,000
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$	$
K. Computer Costs			$	$	$ 1,000	$ 10,000
L. All Other Direct Costs			$	$	$	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$	$	$	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)						
Total Indirect Costs			$	$	$	$
P. Total Direct and Indirect Costs (N + O)			$ 45,000	$	$ 45,000	$ 80,000

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:		
U.S.		

B/C PLANNING OFFICE REPRESENTATIVE W.S. Adams

*Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

(Abstract)

ECUADOR

INIAP (Min. of Agric.) Cesar Chirriboga, Legume program leader

Cornell University
Dr. D.H. Wallace, Dr. Pat Garrett (Dr. Peter Gore)

TOPIC: Program similar to Guatemala, but the Ecuador sites to be chosen nearer the equator to minimize the daylength variable in the field.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

GUYANA

I. Proposed Research

A. Topic: *Integrated Cowpea Production Systems, **Evaluation of Genotypes and Socioeconomic Study.

B. Constraint Area(s) to be Addressed

*1. Efficient Small Farm Production Systems
2. Suitable Agronomic Practices for Each Production System
3. Adaptation to Environmental Stress Conditions
4. Host Country Personnel Training
**5. SocioCultural Constraints
6. Limitations Due to Pests and Diseases
7. Limitations of the Physical Environment
***8. Education, Training and Research Capability

C. Description of Proposed Research (production and non-production)

*1. Definition of categories of soil and ecological conditioning and types of physiological stress parameters.
2. Field trials comparing selected intercropping systems within each set of ecological conditions.
3. Accommodation of prominent cowpea cultivars identified in variety testing programs.
4. Adjustment of research items to findings of sociological cultural data analysis.

**1. Sample forms representing the type of conditions found in the general area. Gather information on farming practices, types of cowpeas used, management, and social variables which might limit the diffusion of new types of varieties.
2. Work with investigator in Guyana to develop a system to screen germplasm. Train personnel in Guyana and graduate students from Guyana in U.S. schools.

D. Anticipated Long-range research goal(s)

*1. Development of profitable cowpea production practices for several sets of environmental conditions.
2. Suitable procedures for minimization of disease and pest incidence in the field.

**1. Integration of social conditions and technology to improve the level of living of the farm families.
2. To increase the total food resource of the country.
3. Contribute to the breeding project and the other technical projects working on cowpeas.
4. To establish a germplasm base for breeding of adapted high yielding cultivars.

*Colorado State **Mississippi State ***Both

Country Guyana

E. First Year Objective(s)

*Initiation of field experiments at research sites with treatments defined by problem identification.
Academic training (MS program) of 1 U.S. and 1 local student.
**Conduct one sociological field study. The selection of suitable germplasma for further evaluation as breeding material and testing in the farming systems.

F. Type of Professional Personnel Required:

*Professional agronomist, and graduate assistant from U.S. and host country.
**Three graduate students.

II. Potential Collaborators

Host Country - P.I.:	Julius A. Ross	Agronomist	Mon Repos
Co-Investigators:	-	Pathologist	-
U.S. - P.I.:	J.O. Garner	Horticulturist	Miss. State Univ.
- P.I.:	C.J. DeMooy	Agronomist	Colorado State
Co-Investigators:	Louis Bluhm	Sociologist	Miss. State Univ.
	John Saunders	Sociologist	Miss. State Univ.
	C.C. Singletary	Horticulturist	Miss. State Univ.

III. Anticipated Procedures

A. Proposed research site(s):

1. Pomeroon
2. Central Agricultural research station
3. Kairuni research station
4. Mississippi State University
5. Colorado State University (for data interpretation)

B. Proposed research methodology in brief:

*1. Problem identification and description of ecological conditions in each production region.
2. Evaluation of traditional production systems.
3. Design and lay-out of field trials involving the following variables as necessary: companion crops, population, planting date, mineral nutrition and aluminum toxicity, factors affecting moisture balance, weed control measures, tillage

*Colorado State **Mississippi State ***Both

Country Guyana

practices, mulching, factors affecting biological N-fixation.
4. Demonstration plots in farmers fields.

**1. Establish linkage with host institution.
2. Position a graduate student (M.S.) in the host country.
3. Use local people to work a field study* under the direction of a U.S. Sociologist.
4. Recruit a student from Guyana to return to U.S. institution.
5. Analyze data at Mississippi State University.

Germplasma evaluation by:

1. Yield data (variety trials)
2. Growth Analysis
3. Screening for disease and pest resistance (In field screening)

(*Field study will be a sample survey of farmsteads in the Pomeroon region; however, informal observation will be used as well.)

C. Approximate time schedule over first year:

*2 months: problem identification.
1 month: design and layout of field trials.
4 months: conducting 3 field trials.
3 months: training of technicians and graduate students.
**1-3 months: make contacts in the host country.
4-6 months: observe field conditions in an informal way.
7-9 months: prepare the research instrument.
10-12 months: Do the field study.

D. Divison of labor:

1. Anticipated responsibilities of host country researchers:

**Provide information, help in the planning, provide transportation and personnel for the field work. Provide skilled and unskilled labor for field work in Guyana. Supervise field work in Guyana.

2. Anticipated responsibilities of U.S. researchers:

**Position a U.S. graduate student in the host country for one year; help conduct the field study; analyze the data. Assist host country personnel in developing needed research capability. Supervise graduate student research. Implement a germplasm development and screening program.

IV. Education Component (indicate number, levels and sites).

**U.S. scientists will provide short courses on various topics in the host country; train graduate students from Guyana in the U.S.

*Colorado State **Mississippi State ***Both

Country Guyana

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	2		$ 12,000	$	$	$
b. Co-investigators	2		$ 5,715	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$	$
b. B Sc. Students			$	$	$	$
c. Graduate Students	3		$ 4,000	$	$ 10,000	$
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical	1	10%	$ 800	$	$	$
f. Unskilled Labor			$	$	$	$
TOTAL SALARIES AND WAGES			$	$	$	$
B. Fringe Benefits (if charged as Direct Costs			$	$	$	$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$	$	$ 1,380	$
D. Equipment Jeep, Screenhouse			$	$	$	$ 10,000
E. Materials and Supplies			$ 1,185	$	$ 5,000	$ 6,000
F. Travel--1. Domestic (Including Canada, U.S.) 2. Foreign 3. Accompanying Dependents (for long-term assignments)			$	$	$	$ 9,000
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges Reprints, etc. Books			$	$	$	$
K. Commuter Costs			$	$	$	$
L. All Other Direct Costs Fuel, Maintenance,			$	$	$	$
M. Training Costs Housing, Subsistence			$	$	$	$
N. Total Direct Costs (C through M)			$	$	$	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) Total Indirect Costs			$	$	$ 6,120	$
P. Total Direct and Indirect Costs (N plus O)			$ 22,500	$	$ 22,500	$ 45,000

PERSONS PREPARING THIS DOCUMENT:	Name	Title and Address
Host Country:	Julis Ross	D14 Central Agric. Station
		Mon Repos, E.C.D.
		Guyana, S.A.
U.S.	James Garner, Clyde Singletary	Department of Hort., Ms. State, MS
	Louis Blum, John Saunders	Department of Sociology, Ms. State, MS

B/C PLANNING OFFICE REPRESENTATIVE D.H. Wallace

*Includes foreign travel and training for host country nationals in the U.S.

Country Guyana

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	25	$ 7,000	$	$ 7,000	$
b. Co-investigators	3	3	$ 7,207	$	$ 7,207	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	3	3	$	$	$ 7,200	$
b. B. Sc. Students	2	50	$	$	$ 10,000	$ 10,000
c. Graduate Students (U.S.)	2	50	$	$	$ 10,000	$ 10,000
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical			$	$	$	$
f. Technicians	3	100	$	$	$	$ 6,200
TOTAL SALARIES AND WAGES						
B. Fringe Benefits (If charged as Direct Costs			$ 2,155	$	$	$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$ 16,362	$	$	$
D. Equipment			$	$	$	$ 6,000
E. Materials and Supplies			$	$	$ 1,000	$ 3,000
F. Travel--1. Domestic (including Canada, U.S.)						
2. Foreign PL and 3 consultants					1,000	5,000
3. Accompanying Dependents (for long-term assignments)			$	$	$	$
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$	$
I. Orientation and Medical Expenses			$	$	$ 500	$
J. Publication Costs/Page Charges Books, reprints,			$	$	$ 793	$ 1,000
K. Computer Costs Local Transportation etc.			$	$	$ 500	$
L. All Other Direct Costs Housing Subsistance			$	$	$	$ 2,000
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$ 16,352	$	$	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) 37.7% both on and off campus Total Indirect Costs			$ 6,158	$	$	$
P. Total Direct and Indirect Costs (N plus O)			$ 22,520	$	$ 45,000	$ 45,000

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:	Julius Ross	D14 Central Agric. Station
Fringe 15.2%	7/1/80 on 9000	Mon Repos, E.C.D.
	2432 on 1600 C.J. deMoov	Guyana, S.A.
U.S.		Professor of Agronomy
		Department of Agronomy
B/C PLANNING OFFICE REPRESENTATIVE	D.H. Wallace	Colorado State University Fort Collins, CO 80524

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

BRAZIL

I. Proposed Research

A. Topic: Insect Pathogens in Cowpea Pest Management Systems for Developing Nations

B. Constraint Area(s) to be Addressed

1. Limitations due to Pests and Diseases (insects)
5. Storage and Commodity Maintenance (insect pests)

C. Description of Proposed Research (production and non-production)

Insect pests are a major constraint to production and storage of cowpeas in Brazil and other LDCs. Ten-fold increases in cowpea yield have been realized in some areas by extensive use of insecticides. Since they can be produced in LDCs, microorganisms pathogenic to the major pests of cowpeas will be developed for integration into insect control programs. The current limitations to microbial control on this crop are (a) virtually no research data, either basic or applied, available on the topic, and (b) virtually no experienced insect pathologists working on this crop worldwide. Alleviation of these limitations will be sought by (a) conducting basic and applied research in a cowpea-producing nation (Brazil) and in the U.S. to increase the data base, (b) sending experienced insect pathologists to Brazil to consult and to conduct experiments, and (c) training scientists and aspiring scientists from LDCs in insect pathology and microbial control. Training will include basic as well as applied concepts to provide the trainee with adequate knowledge to function independently in insect pathology in his or her home LDC.

D. Anticipated Long-range research goal(s)

Develop insect pathogens as effective, economical, and safe cowpea pest management tools fully compatible (integrated) with other insect control practices used by LDC farmers; and train LDC scientists in insect pathology so they can function independently in microbial control projects in cowpeas and other crops.

E. First Year Objective(s)

1. Establish an insect pathology laboratory in CNPAF/EMBRAPA/ Goiania, Brazil.
2. Conduct surveys for pathogens of cowpea pests in cowpea growing regions.
3. Establish insect colonies and conduct screening tests to identify microbial isolates with promise for pest control.
4. Initiate identification, characterization, production and formulation studies of selected pathogens.

Country Brazil

F. Type of Professional Personnel Required

In addition to existing Brazilian and U.S. staff: One insect pathologist (Ph.D.), two full-time technicians (B.S.), and at least one graduate student (Ph.D. candidate).

II. Potential Collaborators

	Researchers	Discipline	Professional Address
Host Country - P.I.:	Almiro Blumenschein	Chief	CNPAF, Goiania
Co-Investigators:	B.P. Neves	Cowpea Entomology	CNPAF, Goiania
U.S. - P.I.:	D.W. Roberts	Insect Pathology	BTI
	R.S. Soper	Insect Mycology	USDA at BTI

III. Anticipated Procedures

A. Proposed research site(s):

Centered at CNPAF in Goiania. Survey for pathogens primarily in N and NE Brazil, field studies in Goiania and in collaboration with scientists in NE Brazil (e.g. Univ. Fed. Ceara, Fortaleza). Belem and an Amazonas site could be included as well. Basic support research on identification, selection, characterization, production, formulation and strain improvement will be conducted at BTI, Ithaca, New York.

B. Proposed research methodology in brief:

The most important pests of cowpea in Brazil are Chalcodermus bimaculatus (a coleopterous pod feeder), Callosobruchus maculatus (a coleopterous storage pest), and Empoasca kraemeri (a leafhopper). These will be the target pests although minor pests (e.g. Elasmopalpus lignosellus, the lesser cornstalk borer) will not be totally ignored. The first step will be to conduct surveys of existing disease agents in the pest populations in Brazil, primarily the NE and Amazonas. Since no insect pathologists have previously worked in these areas, the survey should be very fruitful. The work will continue throughout the study, but will be emphasized in the first year. Later years will emphasize studies to characterize and produce pathogens, both locally discovered and imported, which prove promising in preliminary pathogenicity tests conducted in Brazil and the U.S. (U.S. studies will use Ch. aeneus, Ca. maculatus, and Em. fabae.) Field applications will be made after consulting with subsistence-level growers to determine their existing technology (methods, equipment, etc.) and the use of pathogens integrated

as much as possible into these systems. The approaches will include colonization of new pathogens, encouraging existing pathogens, and mass introductions similar to insecticide application. Fungal pathogens of insects will be emphasized, since this is the pathogen group most effective against beetles and leafhoppers.

C. Approximate time schedule over first year:

The new Goiania research facility will not be completed until approximately March 1981. Accordingly, the laboratory research will be initiated at Boyce Thompson Institute in late 1980, and will begin in Brazil as soon as possible. Field applications will begin in the second season, after identification of promising pathogens and familiarization with existing cowpea production and storage methods in Brazil.

D. Division of Labor:

1. Anticipated responsibilities of host country researchers:

a) Goiania will aa) provide laboratory space, field plots (including preparation and maintenance), assistance with insect rearing, and bb) interact fully with the U.S. scientists working on the project. Also they will cc) assist in helping U.S. scientists make contacts elsewhere and in dd) learning existing cowpea technology.
b) Brazilian scientists elsewhere will assist in the aa)survey work and the bb) field trails. If at all possible, we would like for several scientists from the NE and Amazonas to cc) spend several weeks or months in the insect pathology lab in Goiania.

2. Anticipated responsibilities of U.S. researchers:

a) Coordinate the project and train Brazilian staff in insect pathology.
b) Provide an experienced insect pathologist to conduct the work in Brazil.
c) Survey for cowpea pest pathogens in Brazil.
d) Identify, culture and characterize pathogens.
e) Select virulent pathogens, and improve the best natural strains.
f) Conduct and coordinate field trials.

IV. Training Component (indicate number, levels and sites)

At least one Ph.D. level student will be trained (class work will be in Brazil and the U.S., the majority of the research will be in Brazil). With further financial assistance of CNPAF, a second student could be

added to the program. Additionally, scientists from cowpea-growing areas will be invited to work in Goiania in the new insect pathology laboratory to learn insect pathology techniques so they can effectively use microbial agents for pest management.

Country Brazil

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	25	$ 8700[a]	$	$	$
b. Co-investigators	1	20	$ 8000[b]	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	1	100	$	$	$	$ 20,000
b. Other Professionals			$	$	$	$
c. Graduate Students	1		$	$ 10,000	$	$
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical	1	10	$	$	$	$
f. Technicians	1	100	$	$	$ 9000[a]	$ 4,000
TOTAL SALARIES AND WAGES						24,000
B. Fringe Benefits (If charged as Direct Costs)		10.75	$ 2960[a]	$	$	$ 3,360
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$ 17660	$	$ 9000	$ 27,360
D. Equipment			$	$	$	$ 17,000
E. Materials and Supplies			$ 4000	$	$ 5000	$ 8,000
F. Travel—1. Domestic (Including Canada, U.S.)			600	2,000 (inside Brazil)		
2. Foreign						8,300
3. Accompanying Dependents (for long-term assignments)			$	$	$	$ 1,300
G. Shipment and Storage of Household Goods			$	$	$	$ 3,000
H. Housing Allowances			$	$ 6,000	$	$ 2,000
I. Orientation and Medical Expenses			$	$	$	$ 300
J. Publication Costs/Page Charges			$	$	$	$
K. Computer Costs			$	$	$	$
L. All Other Direct Costs			$	$	$	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$	$	$ 14000	$ 64,960
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) HEW June 30, 1979						
Total Indirect Costs 55% S+W			$ 9740[a]	$	$ 0	$ 11,000
P. Total Direct and Indirect Costs (N plus O)			$ 32000	$	$ 14,000	$ 75,960

PERSONS PREPARING THIS DOCUMENT: [a]BTI pays fringe & indirect cost [b]USDA (no fringe or indirect cost calculation available)

	Name	Title and Address
Host Country:	Almiro Blumenschein[1]	[1]Chief of CNPAF
	Belmiro P. Das Neves[2]	[2]Cowpea Entomology
	Jose Martins[3]	[3]Leader Entomology Lab.
	~~João Pratagil P. de Araujo[4]~~	~~[4]Cowpea Breeding, Seed Quality~~
	Earl E. Wyatt[5]	[5]Cowpea Breeding (UFTA/CNPAF)
U.S.	D.W. Roberts[1]; R.S. Soper[2]; R.A. Daoust[3]; P.R. Hughes[4]	[1]Insect Path./BTI, [2]Insect Mycol./USDA, [3]Insect Physiol./BTI

B/C PLANNING OFFICE REPRESENTATIVE W. Adams

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

BRAZIL

I. Proposed Research

A. Topic: Improved techniques for development of multiple disease resistance in Phaseolus vulgaris L.

B. Constraint Area(s) to be Addressed

Limitations due to pests and diseases.

C. Description of Proposed Research (production and non-production)

Bean diseases, including anthracnose, rust, angular leaf spot, common blight and common bean mosaic are limiting factors in the production of the important bean crop in Brazil. One of the best methods of controlling these diseases is the development of disease resistant varieties. Experimentation will be undertaken to initiate uniform and typical disease development so that accurate data can be obtained on the reaction of beans to the diseases involved. Background research on inoculation techniques and environmental influences must be accomplished. Quantitative methods for determining disease reaction will be developed so that bean cultivars with high levels of disease resistance can be identified. Comparative studies on breeding methodology most appropriate for multiple disease reaction determinations will be included.

D. Anticipated Long-range research goal(s)

Development of new, superior bean cultivars with multiple disease resistance.

E. First Year Objective(s)

(1) Study the reliability of various disease testing sites in Brazil.
(2) Determination of most effective inoculum levels, methods of applying inoculum, and the influences of environmental factors.

F. Type of Professional Personnel Required

1) Plant pathologists
2) Plant breeders

II. Potential Collaborators

	Researchers	Discipline	Professional Address
Host Country - P.I.:	A. Sartorato	Plant Pathologist	EMBRAPA/CNPAF
	I.F. Antunes	Plant Breeder	BR 153-Km 4
			C. Postal 179
			74.000-Goiania-Goias

Country Brazil

		Researchers	Discipline	Professional Address
U.S.	P.I.:	D.J. Hagedorn	Plant Pathologist	Univ. of Wisconsin
		F.A. Bliss	Plant Breeder	1630 Linden Drive
				Madison, WI 53706

III. Anticipated Procedures

A. Proposed research site(s):

Goiania - Goias - Brazil - and appropriate outlying sites.

Madison - Wisconsin - USA

B. Proposed research methodology in brief:

Large scale bean plantings will be made in selected sites in Brazil to take advantage of natural environmental factors and pathogen inoculum conducive to disease development. These disease nurseries will be monitored at appropriate intervals, and if needed, artificial inoculation of the beans will be undertaken. Greenhouse and laboratory research will determine the best way to grow inoculum, apply it and incubate inoculated plants. Related studies will determine if beans can best be inoculated simultaneously or in sequence with two or more pathogens, and which pathogens can be studied in each manner; proper timing and environal factors must be researched. The acquisition, handling, storage and application of naturally-occurring pathogen inoculum will be studied. For instance, viable Isariopsis griseola can be stored for at least a year as a dry leaf powder. Related studies are needed with other bean pathogens. To accurately identify highly disease resistant bean plants, an efficient method for obtaining quantitative data on disease reaction must be developed and used carefully. Several kinds of plant breeding methodology, including a modified backcross system, will be studied for efficiency in the development of disease resistance in beans.

C. Approximate time schedule over first year:

October - July. Study comparative reliability of four disease testing sites for reaction of beans to rust, angular leaf spot, anthracnose and common blight. Jan. - Dec. Study inoculation techniques and environmental influences on disease reactions.

D. Divison of labor:

1. Anticipated responsibilities of host country researchers:

Identify appropriate bean germ plasm for disease reaction investigations, and make large scale plantings for disease testing.

Country Brazil

Study reliability of disease testing sites and large scale inoculation techniques.

Study breeding methodology.

2. Anticipated responsibilities of U.S. researchers:

Study most appropriate inoculation techniques and environmental influences.

Study sequential versus simultaneous inoculations for accurate disease reactions.

Provide guidance in graduate training.

Provide guidance in breeding methodology.

IV. Training Component (indicate number, levels and sites)

One graduate student at Ph.D. level.

Two visiting scientists - no degree.

Department of Plant Pathology - Univ. of Wisconsin - Madison.

Country Brazil

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	15	$ 6,600	$	$	$
b. Co-investigators	1	02	$ 640	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc	1	80	$	$	$ 12,000	$
b. Other Professionals	1	25	$ 4,375	$	$	$
c. Graduate Students	2	100	$	$	$	$ 2,500
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical	1	05	$ 430	$	$	$
f. Technicians	1	100	$	$	$	$ 7,800
TOTAL SALARIES AND WAGES						
B. Fringe Benefits (if charged as Direct Costs			$ 2,433	$	$ 1,146	$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$ 14,498	$	$ 13,146	$ 13,300
D. Equipment			$ 5,000	$	$	$ 5,000
E. Materials and Supplies			$	$	$ 1,200	$ 1,200
F. Travel—1. Domestic (Including Canada, U.S.) 2. Foreign 3. Accompanying Dependents (for long-term assignments)			$	$	$ 3,000	$ 3,000
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$ 2,000	$ 2,000
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$	$	$	$
K. Computer Costs			$ 900	$	$	$
L. All Other Direct Costs Hourly Labor			$ 300	$	$ 1,500	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$ 21,398	$	$ 19,846	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) Total Indirect Costs 42%			$ 9,197	$	$ 8,335	$
P. Total Direct and Indirect Costs (N plus O)			$ 31,045	$	$ 28,181	$ 30,000

PERSONS PREPARING THIS DOCUMENT:	Name	Title and Address
Host Country:	A. Sartorato and	Plant Pathologist EMBRAPA/CNPAF
	I. F. Antunes	Plant Breeder C. Postal 179 74000 Goiania, Brazil
U.S.	D. J. Hagedorn	Univ. of Wisconsin 1630 Linden Drive Madison, WI 53706
B/C PLANNING OFFICE REPRESENTATIVE		M. Wayne Adams

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

BRAZIL

I. Proposed Research

A. Topic: Development of new and superior host-rhizobium combinations in Phaseolus vulgaris that fix high levels of nitrogen under cropping systems suitable to small farming operations in Brazil.

B. Constraint Area(s) to be Addressed

Plant response limitations because of poor nutrient use efficiency.

C. Description of Proposed Research (production and non-production)

Beans are an important food in the Brazilian diet supplying good levels of protein to many inhabitants. Seveny percent of the 2.5 million tons grown annually in Brazil are cropped in association with maize and are grown on farms less than 10 ha. The high cost of N fertilizers preclude the addition by small farmers of large amounts of N to insure sufficient yields of current cultivars. Researchers believe that genetic variability in P. vulgaris and Rhizobium spp. for more efficient N_2 fixation can lead to the development of cultivars that are high yielding under low soil nitrogen. It is proposed to screen Phaseolus germplasm and Rhizobium strains under differing levels of N to identify host-plant-rhizobium associations that are efficient nitrogen fixers and will give high seed yields under no supplemental nitrogen fertilization.

D. Anticipated Long-range research goal(s)

Develop new and superior N_2 fixing varieties of beans that give high yields without supplemental N_2 fertilizer under monoculture and bean-maize association cropping systems.

E. First Year Objective(s)

Develop methodology to screen for genotype-rhizobium associations that show high levels of Nitrogen fixation.

F. Type of Professional Personnel Required

Plant breeder experienced in N_2 fixation; microbiologists;soil fertility and plant nutrition scientist.

Country Brazil

II. Potential Collaborators

	Researchers	Discipline	Professional Address
Host Country - P.I.:	Dr. Keuktki Lee	Microbiologist	EMBRAPA
Co-Investigators:	M. Teixeira	Plant Breeder	EMBRAPA
	P. Pereira	Microbiologist	EMBRAPA
U.S. - P.I.:	Dr. F.A. Bliss	Plant Breeder	Univ. of Wisconsin

III. Anticipated Procedures

A. Proposed research site(s):

Experimental research facilities of EMBRAPA, Goiania, Brazil; facilities of the State University and State Agricultural Experiment Station, Rio Grande do Sul; facilities of N_2 fixation program Kilometer 47, Embrapa, Rio de Janeiro; facilities of Department of Horticulture, University of Wisconsin, Madison, Wisconsin.

B. Proposed research methodology in brief:

I. Young bean plants will be screened for early nodulation in boxes (1.50 x 2.0 x 0.30 m in size) with soil and nitrogen-free medium. The plants will be assayed for dry weight, total N and nitrogenase activity at 25 days after planting.

The plant rhizobium symbionts with the earliest nodulation will be selected. The symbionts with late nodulation will also be selected in the same way.

II. The gene pool will be screened for high seed production at two levels of nitrogen fertilizer (0 N and 30 N Kg/ha) in mono-crops and associated crops during four or five cycles. The selected material will be tested in all of possible combinations of nitrogen levels and will be assayed for nitrate reductase, nitrogenase activity and total N.

C. Approximate time schedule over first year:

Identify genotype-rhizobium associations that show early and late nodulation under 0 levels of N_2 (May 1981 - Oct. 1981); Screen germplasm for

Country Brazil

genetic variants useful in breeding program for improved N_2 fixation efficiency (Oct. 1980 - Oct. 1981).

D. Division of labor:

1. Anticipated responsibilities of host country researchers:

Dr. Keuk-ki Lee (Ph.D.) provide leadership for microbiological aspects and technical inputs into research conducted ir Brazil; ascertain levels of Mb and Zn to insure maximum N_2 fixation; Mr. Pedro A. Pereira (Ing) develop screening techniques for assessing efficiency of rhizobium strains on nitrogen fixing ability of bean genotypes; Measure NO_3 Reductase activity (Hageman procedure) measure nitrogenase activity; Mr. Marcelo G. Teixeira (Ing) screen germplasm for promising genotypes that show high N_2 fixation; develop new and superior genotypes of beans that efficiently fix N_2 under low soil nitrogen levels in monoculture and in maize associated cropping systems.

2. Anticipated responsibilities of U.S. researchers:

Dr. Fred A. Bliss (Ph.D.) screen germplasm for promising genotypes that show high N_2 fixation; develop new and superior genotypes; exchange germplasm to insure material is developed to meet Brazilian objectives; train graduate students; provide training programs for Brazilian collaborators.

IV. Training Component (indicate number, levels and sites)

Laboratory technician (1) H.S. diploma, KM 47 Rio de Janeiro; Engineers (2) M.S. 3 months Univ. of Illinois; 4 months Univ. of Wisconsin; Graduate Assistant (1), M.S. 4 months at Embrapa; Graduate Assistants (2) degree program at Univ. of Wisconsin

Country Brazil

V. Estimated Budget for First Year

	No.	Time % on CRSP	Proposed Budget Estimate: Contrib. from US Institut.	Contrib. from Host Institut.	Requested from Title XII: Expended in US	Requested from Title XII: *Expended in/for Host Country
A. Salaries and Wages						
1. Senior Personnel						
a. P.I.	1	10	$ 3,000	$	$	$
b. Co-Investigators	3	30	$	$	$	$
2. Other Personnel (Non-Faculty)						
a. Research Associates-Postdoc			$	$	$	$
b. Other Professionals			$	$	$	$
c. Graduate Students	3	150	$	$	$ [illegible]	$ [illegible]
d. Pre-Baccalaureate Students			$	$	$	$
e. Secretarial-Clerical	1	5	$ 500	$	$	$
f. Technicians	1	10	$ 1,500	$	$ 1,500	$
TOTAL SALARIES AND WAGES						
B. Fringe Benefits (If charged as Direct Costs			17.0% $	$	$	$
C. Total Salaries, Wages, and Fringe Benefits (A + B)			$ 5,000	$	$	$
D. Equipment			$	$	$	$ 11,400
E. Materials and Supplies			$ 1,000	$	$ 1,000	$ 500
F. Travel--1. Domestic (Including Canada, U.S.) 2. Foreign 3. Accompanying Dependents (for long-term assignments)			$	$	$ 3,000	$ 3,000
G. Shipment and Storage of Household Goods			$	$	$	$
H. Housing Allowances			$	$	$ 2,300	$ 2,300
I. Orientation and Medical Expenses			$	$	$	$
J. Publication Costs/Page Charges			$ 500	$	$ 500	$
K. Computer Costs			$ 500	$	$	$
L. All Other Direct Costs Hourly Labor			$	$	$ 2,000	$
M. Training Costs			$	$	$	$
N. Total Direct Costs (C through M)			$	$	$	$
O. Indirect Costs (Specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks) Total Indirect Costs			$	$	$	$
P. Total Direct and Indirect Costs (N plus O)			$	$	$	$
					30,000	30,900

PERSONS PREPARING THIS DOCUMENT:

	Name	Title and Address
Host Country:		
U.S.		

B/C PLANNING OFFICE REPRESENTATIVE M.M. Adams

* Includes foreign travel and training for host country nationals in the U.S.

BEAN/COWPEA CRSP JOINT RESEARCH OUTLINE

(Titles)

CIAT (Colombia)

Collaborators: Dr. Jeremy Davis
Dr. Peter Graham

Michigan State University
Dr. M.W. Adams
Dr. Frank Dazzo

CONSTRAINT: Plant Response Limitations:

TOPIC: Improving yield and stress resistance in beans through exploitation of carbohydrate partitioning and architectural patterns.

CONSTRAINT: Nitrogen-fixation

TOPIC: Micro-symbiont competition in the nitrogen-fixing rhizobium-bean symbiosis.

A P P E N D I X H

EXAMPLES OF PLANNING OFFICE COMMUNICATIONS

in preparation for

LDC RESEARCH DESIGN DEVELOPMENT TRIPS

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

It is indeed a pleasure to be writing this letter inviting your active participation in the next phase of the development of an international Collaborative Research Support Program (CRSP) in Beans and Cowpeas sponsored by USAID through Michigan State University. Previous communications with you and others from your country have suggested there is interest in working with the Bean/Cowpea CRSP as part of the research program there. Research related to small farm production and consumption of beans/cowpeas is particularly important since such research could contribute a great deal to the resolution of significant food and hunger problems. We are presently working to make the resources of this Program available to you as appropriate.

Much has happened in the last few months. There have been several meetings with representatives of African and Latin American countries discussing ways in which Bean/Cowpea CRSP activity might best be useful to countries in addressing the problems of world famine. From the results of these meetings and a review of the literature, there has emerged a set of country-related general research topics, with sub-items for specific research projects identified. These topics, taken together, make up the skeleton global research plan in beans and cowpeas, a plan which (1) must show a relationship to country interests, needs and prior research, (2) must avoid duplication from country to country wherever possible, and (3) must demonstrate substantive involvement of LDC scientists and show subsequent commitment of all parties concerned. The contributions of country representatives and representatives of the International Centers have been essential to our progress to date.

We have also begun identifying U.S. institutions and their professional research personnel interested in working in Africa and Latin America as part of the Bean/Cowpea CRSP. Representatives of these U.S. institutions were recently brought together in yet another meeting to identify their specific research interests, to suggest others from their institutions who might also be available to participate and to familiarize them with what we at the Planning Office have learned from our own visits to various countries, the visit reports of the bean/cowpea research exploration teams, the previous meetings with LDC representatives held in this country, and the review of relevant literature. We now have a list of such persons, whose research areas and competence have been reviewed by U.S. and LDC scientists, who are interested in working with professional counterparts in Africa and Latin America.

It is our intention to send representatives of this U.S. group who are interested in East Africa or Latin America to the March legume meetings in Malawi or Guatemala respectively. At those meetings the U.S. researchers will be prepared to confer with LDC prospective collaborators about the specifics of the research design anticipated. At the conclusion of those meetings the U.S. researchers will be available to return with their counterparts to the countries where the research will take place. At that time they can review with their LDC colleagues the context of the research problems, the facilities and personnel available, and the specific requirements of the project to be written into the research design. It is anticipated that the U.S. researchers interested in West Africa will go directly to the appropriate countries for the same purposes. These trips will also take place in March. To facilitate this process and to assure that we send to you only persons whose professional expertise is most appropriate for your research requirements or who can represent such persons, we are enclosing herewith a set of materials for your review. We need your response to these materials as quickly as possible so that the necessary formal procedures for foreign travel of the appropriate persons to the March meetings can be completed. Clearly these procedures are faced with severe time constraints and early response is needed if this effort is to be successful.

Enclosed you will find several documents. The first is a general description of the Bean/Cowpea CRSP and its overall philosophy. We invite you to review it carefully and make comments if you wish. The second document is a set of general research topics and specific research items, by country. These have resulted from the country visits and meetings discussed earlier. Together they suggest the general global perspective of the CRSP. Unfortunately, there will not be adequate resources to do all the research suggested under the various research topics. Further culling and clarifying must yet be done. Additionally, the issue of duplication must be better resolved. Your contribution will be most helpful in this regard.

The third document, the extra long sheet, is a copy of the general research design as it emerged for the country you represent. We ask you to complete that sheet in the following manner and return it to us as quickly as possible. Look over the research items presented; if necessary you may add an additional one in the space provided at the bottom. Rank order them all in the Rank Column by giving the number 1 to the highest, most important item to be researched first, the number 2 to the next highest, and so on. Please understand that because of limited funding undoubtedly all the research items will not be funded. Therefore, in your ranking, it is necessary to consider what are the necessary next steps in meeting overall research goals. A research item appropriate as a next step in your program should be assigned the number 1 even though it is not necessarily the important long range research you and your colleagues wish to be doing in 5-10 years. Considering the state of knowledge, present facilities, and available personnel, the more advanced work might need to wait until the necessary resources can be built up. To assign top priority to research items where required resources are missing is to risk not being a part of the initial funding cycle. Please include your comments about the ranked items by number on the back of the same sheet. Additional sheets may be attached if you wish. We will carefully review your comments and rankings as we make preparations for the March visits.

We apologize for the length of this letter and the tasks which must be placed upon you. We are most concerned that the Bean/Cowpea CRSP be developed in a true atmosphere of collaboration, awkward though the initial stages of the collaboration may be. Your willingness to cooperate in this task is an essential ingredient in evolving a long-lasting, multi-cultural, research partnership among colleagues. It is our belief that such a partnership can be a valuable and rewarding experience, both personally and professionally, for all concerned. We look forward to such a relationship.

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

M. W. Adams
Planning Officer
Bean/Cowpea Planning Program

PBM/MWA:kc

Enc.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING · MICHIGAN · 48824

We are delighted that you have agreed to represent the Bean/Cowpea CRSP in research design meetings with LDC scientists abroad. As you prepare for those meetings there are several items about which we need to communicate. These items are listed below with additional information attached as indicated.

1. You have agreed to visit the following country(ies)_____ _____. Approximate dates during which you can expect to be away are_____ _____. Exact dates will be confirmed later.

2. Expenses (travel and per diem, but no salary) will be paid by the Bean/Cowpea Planning Office. We are making the travel reservations and room arrangements for you. Visa requests will be made through a visa service by our travel agent. She will be contacting you requesting completion of a visa form and asking you to send your passport to her to have it processed and stamped. You will need a number of small photos. USAID country clearances are also being requested by this office.

3. You must attend to your own health and personal needs. Please call your health department and begin getting your shots. Get your own allergy medication (if you take such), water purifier pills, anti-diarrhea medication, and any other pharmaceuticals you think necessary from your local pharmacy.

4. Your U.S. colleague, other than the representative of the Planning Office, will be_____ from_____ _____. A copy of your colleague's proposal is enclosed to give you an idea of the professional resources represented by this person. Your task will be to sit down with this person and your LDC counterparts and write a new joint research design in line with the needs and resources of all concerned. The Planning Office person will be there to help facilitate that process. It is hoped that you and your colleagues will be able to spend some time before the writing begins reviewing research sites, physical resources, and the overall context of the problem to be addressed.

A packet of country specific research topics is enclosed for your information. These are presently being modified by the potential LDC collaborators. If we're lucky, they will have the modified versions back to us in time for us to forward them to you before you leave.

5. One of your tasks will be to make out a summary budget sheet that includes the 25% contribution required of the U.S. institutions involved. Be prepared to be as accurate as possible. USAID has indicated that the allocation for the Bean/Cowpea CRSP for the first year will be around $3,000,000 for the total program, including management entity costs. Because this low sum is being spread over approximately 14 countries, it is anticipated that the average total country Bean/Cowpea Title XII program should not exceed an average of approximately $180,000 for the first year. The small countries' programs would appropriately be considerably smaller than the average. An average country research program budget might look as follows:

		Expend in U.S.		Expend in LDC
U.S. Institutions 25% Match	$ 45,000	$45,000		
Bean/Cowpea CRSP Funds	135,000	45,000		$90,000
	$180,000	= $90,000	+	$90,000

The total research program you write together, therefore, should be under this amount ($180,000) for the first year. Included must be all training and travel costs.

6. We plan to compile the results of all our LDC meetings in time to present a global Bean/Cowpea CRSP plan to JRC at their May meeting. Since our planning grant time is over on June 30th, we must make that deadline. For that reason we are attempting to standardize all information collection tasks. With nearly 30 scientists travelling and most of us not getting back to the states until the first or second week in April, we really need your cooperation. You will be given the working forms to be used in your deliberations.

7. The objectives of these meetings are as follows:

   a. To have representatives of all persons to be involved in the Bean/Cowpea collaborative research participating in the actual designing of that research.

   b. To build a sense of comradeship among the scientists who will be working together.

   c. To facilitate greater understanding by U.S. scientists of the research resources and the overall context of the problem to be researched.

   d. To develop a sense of long range and short range objectives of the collaborative research, considered in the context of strengthening each instituion's ability to address problems of world famine prevention.

   e. To explore the range of production and non-production questions needing to be answered in addressing the identified problems.

f. To identify specific colleagues who could appropriately be involved in the research activities.

g. To write up a draft research design as indicated on the form and recommend it to the Planning Office for inclusion in the Bean/Cowpea CRSP plan.

Well, as you can tell, this is our largest undertaking to date. Your previous involvement has made the Bean/Cowpea CRSP an exemplary one, held in high regard by our Washington colleagues. The degree to which you carry out your mission efficiently and effectively will determine the extent to which we continue to enjoy good relations with JRC and BIFAD. It can also make a long term difference in your professional and personal life. Good luck, and have a safe and fruitful trip.

More information will be forthcoming from the Planning Office as appropriate. Should you have any dire questions or critical communications, feel free to call us at (517) 355-4693. If Wayne or myself is not available, just leave a message with Kay (the Planning Office secretary who keeps things moving).

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

PBM:kc

Enc.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

TO: The Consul Office of _____

FROM: _____
M. W. Adams
Bean/Cowpea Project Director

Listed below is the information required to obtain a _____ visa for _____

_____ is a member of the faculty of _____ at _____.

The purpose of the visit is to meet with USAID Mission personnel, the Ministry of Agriculture and professional colleagues at various institutions to discuss bean/cowpea agriculture, digestibility and use.

This visiting scholar will be in the country _____
(dates)
The USAID Bean/Cowpea Project, Department of Crop and Soil Sciences, will guarantee financial responsibility for this scholar whose contact person(s) is(are) listed below.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING · MICHIGAN · 48824

January 30, 1980

Dear Colleagues:

More communications from the planning office regarding your up-coming trip!

First, please remember that the trip you are about to take is as political as it is professional. If you do not show proper protocol relative to your host country and its government (usually the Ministry of Agriculture) you may not be allowed to do the work you develop with your collaborators. Governments usually have to approve all research which is to take place in their country. Further, USAID mission people have a great deal at stake in their relations with the host country government and have a lot invested in their full appreciation and respect for the local situation. To the extent that they can squeeze us into their on-going responsibilities I have found mission people to be very helpful. Especially is this true when one exhibits honesty, patience and mutual respect. Remember, country clearance comes from the mission and it can easily be denied (or delayed) if you are seen to be a problem.

Second, many of you have expressed an interest in knowing more about the host country so as to be able to communicate appropriately with host country nationals. With the help of the MSU African Study Center and Latin American Study Center the enclosed materials are made available to you as appropriate. Please read this material and let me know if there are any other materials or information you would find useful. Other material may be sent later.

Third, I'm sure everyone has a list of pet things not to forget when traveling in developing countries. The first rule of thumb is to travel light. It will be the usual case that you will have to carry your own belongings and perhaps for some distance (please leave the bag home with the zipper or catch that's about to go). Especially is this critical if you find yourself running to catch a plane that only flies once a week (and of course in such cases it is the only one there is). I like to travel with all my belongings in a backpack - especially after the following incident. Once in Africa, after arriving an hour and forty-five minutes early for a plane, I was told at the airport entrance that the plane was leaving an hour and a half early - was then boarding and about to take off. What about changing my country currency at the airport bank (you frequently are not allowed to take country currency out of the country)? What about customs? Well, when I saw the characteristic shrug of the shoulders, I nearly threw my currency at anybody who would take it and ran like O.J. through the necessary check points. Which way was the gate - which way!!? As they closed the plane doors behind me with the motors running, I breathlessly blessed the day back in East Lansing I had put back half the stuff I had laid out to take.

Enclosed is a packing check list of a very experienced friend of mine in International Studies. He admits there are a few trips where a tennis racket is

inappropriate, but being really into tennis he considers it any time he can. My own list of "things not to be forgotten" includes the items below.

"Off" or "Cutters" (small lotion bottles, not spray)
Fly swatter (metal handle which will bend, not plastic)
Very small travel alarm clock
"Wash and Dry" or "Wet Ones"
Soap (that can be used for washing clothes as well as self) in plastic dish and/or liquid soap in small plastic bottle which can also be used easily for dishes
Wash cloth in plastic bag

My daughter, who has traveled in Africa, prevailed upon me to take a few packages of dried soup and tea bags for emergencies (I also added granola bars).

Finally, KEEP BRUSHING UP YOUR LANGUAGE. Even if your facility is crummy, your attempt to struggle and learn even a little will mean a lot to your collaborator whom you are forcing to speak your language. Collaboration should mean you both contribute. That he or she is smarter than you is your problem. Acceptance of a need to work on learning the language will please your host. Would you believe - as pressured as Wayne Adams is, he is sitting in on a Spanish class every Tuesday night from 7-10! You too can sound like Ricardo Montalban or Brigitte Bardot or whomever!!!

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

PBM:bw

Enc.

Check Sheet for International Travel

Office

___ calculator*
___ letterhead
___ multicarbon forms
___ pens
___ dictating machine*
___ note paper*
___ biz cards*
___ personal photos*
___ torch & batteries
___ check book*
___ work for enroute*
___ paper clips, rubber bands
___ envelopes
___ address labels

TRAVEL*

___ tickets
___ cash
___ traveller's checks
___ health card
___ eye glasses
___ passport
___ visas
___ credit cards
___ radio**
___ extra eye glasses**

MEDICAL*

___ malaria pills
___ band aids
___ Contac
___ Kleenex
___ nail clipper
___ aspirin
___ antiseptic
___ ace bandage
___ Lomotil

SHAVING*

___ razor
___ tooth brush
___ comb
___ deoderant
___ shampoo
___ soap
___ sleep mask
___ shave cream
___ tooth paste
___ blades
___ foot powder
___ Vitalis
___ afta shave

CLOTHES

___ suit(s)
___ extra work trousers
___ shorts (6)+(1)*
___ socks (9)+(1)*
___ ties
___ country shoes
___ suit bag
___ shirts (6)+(1)*
___ T shirts (6)+(1)*
___ handkerchiefs (12)+(1)*
___ slippers*
___ city shoes

TENNIS

___ racquets
___ shoes
___ clothes (A)
___ balls
___ extras
___ clothes (B)

* = carry on ** = not carry on

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 1, 1980

Dear Colleagues:

You will all be pleased to learn that both foreign travel and foreign student training costs will be counted in your research against the "funds to be spent in host country" category. This information was confirmed by John Yohe, our AID liaison officer.

When I sent your U.S. representatives sheet out, Wisconsin still had not been able to get someone who could travel for this project. It has now been settled, however. Dr. Don Hagedorn, Department of Plant Pathology, 1630 Linden Dr., University of Wisconsin, Madison, WI 53706, will be going to Brazil and can be added to your list.

We have found that the Title XII Strengthening Grant funds can be used to pay host country students enrolled on our campus to tutor us. I now have a three hour lunch once a week with a Camaroonian student during which time we try to speak nothing but French (except for the numerous times things get hopelessly confused). If your University has received a Title XII Strengthening Grant you may want to check on this.

Ann at College Travel tells me she has mailed out all the visa request forms to everyone. Please get them back to her by return mail. Many countries are notoriously slow in granting visas. For you to be left here by the rest of the team because you took too long to return your form would be most unfortunate for everyone.

We are going to try to estimate your expenses (plane ticket will be pre-paid from here) on the basis of standard AID per diem for the countries in which you will be traveling. Based on that we will try to get issued to you a travel advance for 75% of the total. Save all receipts for everything and get your expense sheet back to us as soon as you return home. Since the grant will be over in June this must be taken care of quickly.*

Obviously you will need some money of your own. Should you have to spend any of it for allowed expenses you will be reimbursed. Kay (the Planning Office secretary) is making up a sheet to give you information on allowed expenses which you should receive soon. This whole expedition for 24-25 scientists going to 14-15 countries is tremendously expensive. Going luxury class is not only impossible but also ridiculous given our overall mission. At each choice point remember Uncle Sam is getting more and more tight-fisted and all financial decisions must be justifiable or they may not be reimbursed.

Enclosed is an interesting communication exchange between Thomas Sanders of the

American Universities' Field Staff (AUFS), to which Michigan State University belongs, and Wayne. While none of you is going to Mexico, our information suggests that the situation presented here is not a-typical throughout the 3rd world. If you're not a hard-nosed realist, this material is especially important for you. Based on this, we can have some interesting discussions regarding our own input when we get together.

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

* P.S. Although the extended grant has not yet been awarded, it was approved by JRC at their January meeting. It's presently working its way through the Washington structure and we hope will be approved soon. There is always the chance, however, that none of us will be going anywhere.

PBM:bw

Enc.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 4, 1980

TAKE THIS MATERIAL WITH YOU WHEN YOU TRAVEL.

TO: Persons travelling for the Bean/Cowpea Planning Program

FROM: Kay Carter, Secretary, Office of Bean/Cowpea Planning Program

RE: Instructions for getting reimbursement for travel expenses

Carefully study the enclosed copy of the Memorandum regarding foreign travel from Howard G. Grider, Director of the Contract and Grant Administration here at Michigan State University and the attached sample Travel Voucher.

Keep:

1. Receipts of directly reimbursable bills, such as:
   - A. Hotel bills
   - B. Taxis--for business purposes (Not to go to a restaurant from your hotel. Per diem should cover this.)
   - C. Tourist cards
   - D. Airport taxes
   - E. Others you think applicable
2. Your complete airline ticket stub (receipt). Your air ticket fare will be pre-paid by the College Travel agency here in East Lansing but the complete ticket receipt must be submitted with your travel voucher showing your expenses.
3. Your travel itinerary (the one furnished by the travel agency). Note any changes such as other cities visited, and departure and arrival times. Also note any trips by car, showing cities visited, and departure and arrival times.
4. A daily chronologically ordered record on which all reimbursable receipts are recorded, using the outline on page 2. Note on each receipt the exchange rate for the country in which it is used. To avoid confusion, each individual should pay for his own expenses only. If it is necessary to pay for the expenses of a fellow traveller at any time, both parties should so note on the expense sheet.

PLEASE SUBMIT YOUR EXPENSES AND RECEIPTS TO THE PLANNING OFFICE IMMEDIATELY UPON YOUR RETURN.

PLEASE RECORD YOUR DIRECTLY REIMBURSABLE EXPENSES DAILY AS FOLLOWS:

Date	Paid to What Agency	Purpose	City & Country	Exchange Rate Units/US Dollars	Amount in Foreign Currency	Amount in American Money

*PLEASE WRITE THIS NUMBER ON EACH CORRESPONDING RECEIPT.

MICHIGAN STATE UNIVERSITY

OFFICE OF THE VICE PRESIDENT FOR BUSINESS AND FINANCE
CONTRACT AND GRANT ADMINISTRATION
TELEPHONE (517) 355-5040

EAST LANSING • MICHIGAN • 48824

March 14, 1979

MEMORANDUM

TO: Deans, Directors and Department Chairpersons

FROM: Howard G. Grider, Director

SUBJECT: Foreign Travel

I Definition

MSU travel regulations consider travel as foreign when the destination is outside the United States, Canada, Alaska, Hawaii or Puerto Rico. However, when travel is supported by a U.S. Government contract or grant it is necessary to examine that document to determine what is defined as foreign travel. It is recommended that the Office of Contract and Grant Administration be consulted when such foreign travel is contemplated.

II Tickets

Normally, travel should be on American Flag carriers, by the most expeditious route and at less than first class rates. When travel is to be charged to a grant or contract it should be reviewed for restrictions and exceptions to the normal University travel regulations.

Tickets may be ordered through a travel agency or airline and paid directly from the grant or contract account. Travel advances are not given to staff members to cover international or foreign fares, but are intended to provide for per diem, internal travel and miscellaneous enroute costs.

III Per Diem

The per diem in lieu of subsistence expenses includes all charges for meals, lodging, personal use of room during daytime, baths, all fees and tips to waiters, porters, baggagemen, bellboys, hotel maids, dining room stewards, and others on vessels, hotel servants in foreign countries, telegrams and telephone calls reserving hotel accommodations, laundry, cleaning and pressing of clothing, fans and fires in rooms, and transportation between places of loding or business and places where meals are taken. The term "lodging" does not include accommodations on airplanes, trains, or steamers, and these expenses are not subsistence expenses.

Receipts for lodging should be secured to comply with the new income tax laws.

For travel outside the conterminous United States, reimbursement for each per diem locality will be the average cost of lodging rounded to the next whole dollar plus 50 percent of the maximum locality rate. Total reimbursement shall not exceed the maximum per diem for each locality, unless specific approval is given in advance for actual expenses. Maximum locality rates shall be those established by the Department of State for foreign areas.

III Per Diem continued

Per diem is computed on a daily basis with the day divided into four quarters. They are: midnight to 6:00 a.m., 6:00 a.m. to noon, noon to 6:00 p.m., and 6:00 p.m. to midnight.

The international rate is used for the time enroute for foreign destinations. It is also used for travel between foreign locations when the total time enroute exceeds a full quarter. This rate is $6.00 per day. Foreign countries are assigned a daily rate by the U.S. State Department, subject to review and change every month. This information is available in the Office of Contract and Grant Administration.

When a staff member leaves his residence on a foreign assignment, the international per diem rate is effective the quarter of a day during which he leaves. This rate continues through the end of the quarter of a day in which he arrives at a location where he will remain for at least the next full quarter.

The rule is that the rate in effect at the beginning of a quarter applies through the end of the quarter in which a change takes place.

When either meals or lodging are furnished without charge, the per diem claim should be reduced by 50 percent. This applies to "in-country" not "international" per diem.

If a staff member travels by an indirect route for personal reasons, per diem will normally be paid only for the time it would take to travel by the most expeditious route.

IV Travel Vouchers

The attached voucher has been prepared for a hypothetical trip and is an example of how a travel voucher should be submitted. In processing travel vouchers there are a number of items which should be noted:

If a travel advance was secured by the staff member, the voucher may be payable to "MSU for the account of _____."

The travel authorization and travel voucher should agree as to the account number or numbers to be charged and the purpose of the trip as well as the countries which will be visited.

If more than one account number is to be charged, the various costs claimed should be marked to indicate the appropriate account. Ticket stubs and receipts for expenses claimed should be attached to the voucher and any foreign currency exchange rate used should be noted.

In case of indirect routing for personal reasons, the extra transportation costs should be at the traveler's expense and the additional time should be charged as vacation.

University general funds cannot be used for foreign travel unless specified for that purpose. Please refer to MSU Travel Regulations dated July 1, 1977, page 8, # VIII and page 21, # XVIII.

International airfare should not be charged on the travel voucher if it has been paid to the travel agency or airline directly. However, there may be some incidental travel which could not be anticipated before the staff member left for overseas. All ticket stubs must be attached to the

IV Travel Vouchers continued

voucher even though the air fare was prepaid. Ticket stubs are necessary to provide audit documentation to cover the prepayments to travel agencies. Receipts for lodging should also be attached to the travel voucher, along with any other documentation available for verifying expenses.

Taxi expenses are allowable for travel related to business. For example, taxis to and from hotel to airport and taxis from hotel to a business meeting are allowable. Taxis from hotel to a restaurant to eat a meal, or taxis for sightseeing trips are not allowable.

Please note in the sample voucher that time of departure and arrival are directly opposite the amount claimed for per diem.

It is requested that you distribute this information to any individuals involved in foreign travel.

Any questions regarding this subject should be directed to the Office of Contract and Grant Administration.

bw

Attachment

SAMPLE

- 235 -

MICHIGAN STATE UNIVERSITY
TRAVEL VOUCHER

Page 1 of 3

...are with typewriter in quadruplicate.
...efer to the University Travel Regulations for correct preparation.
3. Submit white, green, yellow and blue copies to the Comptroller's Office.
4. For out-of-state travel submit to Office of the Provost.

Distribution

White - Comptroller's Office
Green - Return to department with the voucher number
Yellow - Voucher audit
Blue - Mail to traveler with the check

P Name: Jane Doe

Dept.: Int'l Studies & Programs

Mailing Address (if other than to Dept.):

ACCOUNT TO BE CHARGED

Department: Int'l Studies & Programs

Account No.: 71-9999

Account Name: Nepal Project

Purpose of Trip: Short-term Consultant in Nepal, performing administrative services under the above contract, AID/ta-C-0000

*If check is to be deposited in your bank, precede name with: *(name of bank) for the account of*

*If check is to be sent to MSU Cashier to apply on advance, precede name with: *Mich. State Univ. for the account of*

This column is for complete itemization of travel.

ATE	STARTING POINT	DESTINATION	Manner of Travel MILEAGE	RATE	AMOUNT
78					
15	E.Lansing	airport	Auto 10 mi	.17 ~~.19~~	1.70 ~~1.90~~
15	1320 Lansing				
16		0810 London			
7	0900 London				
8		0130 Delhi			
8	0730 Delhi	0855 Kathmandu			
9	1630 Kathmandu	1730 Rampur			

Travel Sub-Total $

SUBSISTENCE and MISCELLANEOUS

Br - Breakfast Lu - Lunch Di - Dinner Lo - Lodging Mi - Miscellaneous

DATE		AMOUNT
1978 8/27	M - inoculations	4.00
9/14	M - inoculations	2.00
9/15	Int'l per diem 2/4 @ $6	3.00
9/16	2/4 @ $6	3.00
9/16	London per diem 2/4 @ $82	41.00
9/17	2/4 @ $82	41.00
9/17	In'l per diem 2/4 @ $6	3.00
9/18	1/4 @ $6	1.50
9/18	Delhi per diem 1/4 @ $30	7.50
9/18	Kathmandu per diem 2/4 @ $40	20.00
9/19	3/4 @ $40	30.00
9/19	Rampur per diem 1/4 @ $12.50	3.13
9/20-9/25	6 days @ $12.50	75.00

Subsistence and Misc-Sub-Total $

EREBY CERTIFY that this claim is correct d reimbursable under published travel regulions of Michigan State University.

NED: _____ Traveler's Signature

TE: _____

APPROVED BY:

_____ Department Chairman

_____ Dean or Director

Travel Sub-Total	$
Total Claim	$

ck Date | Check No. | Voucher No.

MICHIGAN STATE UNIVERSITY
TRAVEL VOUCHER

...s with typewriter in quadruplicate.
...efer to the University Travel Regulations for correct preparation.
3. Submit white, green, yellow and blue copies to the Comptroller's Office.
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*Name: Jane Doe

Dept.: Int'l Studies & Programs

Mailing Address (if other than to Dept.):

ACCOUNT TO BE CHARGED

Department: Int'l Studies & Programs

Account No.: 71-9999

Account Name: Nepal Project

Purpose of Trip: Short-term consultant in Nepal, performing administrative services under the above contract, AID/ta-C-0000

*If check is to be deposited in your bank, precede name with: *(name of bank) for the account of*

*If check is to be sent to MSU Cashier to apply on advance, precede name with: *Mich. State Univ. for the account of*

This column is for complete itemization of travel.

DATE	STARTING POINT	DESTINATION	Manner of Travel MILEAGE	RATE	AMOUNT
9/26	1400 Rampur	1500 Kathmandu			
9/30	1630 Kathmandu	1730 Rampur			
10/3	0630 Rampur	1330 Kathmandu	auto		N/C
10/4	1600 Kathmandu	1710 Delhi			
		Travel Sub-Total			$

SUBSISTENCE and MISCELLANEOUS

Br - Breakfast Lu - Lunch Di - Dinner Lo - Lodging M - Miscellaneous

DATE		AMOUNT
1978 9/26	3/4 @ $12.50	9.39
9/26	Kathmandu per diem 1/4 @ $40	10.00
9/27-9/29	3 days @ $40	120.00
9/30	3/4 @ $40	30.00
9/30	Rampur per diem 1/4 @ $12.50	3.13
10/1-10/2	2 days @ $12.50	25.00
10/3	3/4 @ $12.50	9.39
10/3	Kathmandu per diem 1/4 @ $40	10.00
10/4	3/4 @ $40.	30.00
10/4	M - airport tax	3.36
10/4	Int'l per diem 1/4 @ $6	1.50
10/5	Delhi per diem 1/4 @ $30	7.50
10/5	Int'l per diem 2/4 @ $6	3.00
	Subsistence and Misc-Sub-Total	$

I HEREBY CERTIFY that this claim is correct and reimbursable under published travel regulations of Michigan State University.

SIGNED: _____ Traveler's Signature

DATE: _____

APPROVED BY:

_____ Department Chairman

_____ Dean or Director

Travel Sub-Total	$
Total Claim	$

Check Date	Check No.	Voucher No.

4154

SAMPLE

MICHIGAN STATE UNIVERSITY

TRAVEL VOUCHER

...are with typewriter in quadruplicate.
...fer to the University Travel Regulations for correct preparation.
Submit white, green, yellow and blue copies to the Comptroller's Office.
For out-of-state travel submit to Office of the Provost.

Distribution

White - Comptroller's Office
Green - Return to department with the voucher number
Yellow - Voucher audit
Blue - Mail to traveler with the check

Name: Jane Doe

Dept.: Int'l Studies and Programs

Mailing Address (if other than to Dept.):

ACCOUNT TO BE CHARGED

Department: Int'l Studies & Programs

Account No.: 71-9999

Account Name: Nepal Project

Purpose of Trip: Short-term consultant in Nepal, ...erforming administrative services under the above ...ntract, AID/ta-C-0000.

*If check is to be deposited in your bank, precede name with: *(name of bank) for the account of*

*If check is to be sent to MSU Cashier to apply on advance, precede name with: *Mich. State Univ. for the account of*

This column is for complete itemization of travel.

SUBSISTENCE and MISCELLANEOUS

Br - Breakfast Lu - Lunch Di - Dinner Lo - Lodging M - Miscellaneous

...ATE	STARTING POINT	DESTINATION	Manner of Travel MILEAGE	RATE	AMOUNT	DATE		AMOUNT
	1115	1930				1978	London per diem	
...0/6	London	Lansing	Air	RT	*	10/5	1/4 @ $42	10.50
			Auto					
...0/6	airport	E.Lansing	10 mk	.15	1.50	10/6	2/4 @ $42	21.00
							Int'l per diem	
						10/6	2/4 @ $6	3.00
	air fare paid on DPV #12345		6 dated					
	...15/78 to Abe's Travel Agency.							

...ER DIEM CALCULATIONS — NON-LODGING

...ATE	LOCATION	CURRENT RATE	ALLOWABLE (50% of RATE)	AVERAGE LODGING (1)	ALLOWABLE P.D. RATE
.../16	London	$84	$42	$40 (2)	$82
.../18	Delhi	$60	$30	$-0- (3)	$30
.../18	Kathmandu	$40	$20	$23	$40
.../19	Rampur	$15	$7.50	$5	$12.50
0/4	Delhi	$60	$30	$-0- (3)	$30
0/5	London	$84	$42	$-0-	$42

...XPLANATORY NOTE

(1) Actual cost per receipts raised to next whole dollar.
(2) Actual cost per receipt amounted to $39.75
(3) No cost for lodging, stayed with friends.

Travel Sub-Total	$ 3.00	Subsistence and Misc-Sub-Total	$ 530.90
		Travel Sub-Total	$ 3.00
		Total Claim	$ 533.90

I HEREBY CERTIFY that this claim is correct and reimbursable under published travel regulations of Michigan State University.

SIGNED: _____ Traveler's Signature

DATE: _____

APPROVED BY:

_____ Department Chairman

_____ Dean or Director

Check Date	Check No.	Voucher No.

...4154

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

Enclosed please find host country response to the research priorities questions (on LDC Collaborators Evaluation Sheet of Country Research) sent them in January.

Please review carefully as this information becomes the basis on which you start discussions and research negotiations. Note also the persons involved in this deliberation as indicated at the bottom of the form.

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

PBM:kc

Enc.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 12, 1980

Dear Colleagues:

Yet another communication from the planning office - (we have high hopes).

On the travel - remember to fill out all documents relative to the countries you are visiting as a tourist. I realize there are temptations to indicate "business" on the forms since we all take ourselves quite seriously. But "business" generally means commercial business to these governments and we are not going to transact any of that. To avoid misunderstandings and being held up needlessly, always identify yourself as a tourist meeting with USAID mission people and University colleagues.

For some of you receiving this letter there are additional readings enclosed for your edification!

At this writing the word from Washington is that the grant looks positive. We expect to hear of the critical signature having been received on it by Friday (February 15). Since I am to leave with the first group of you on the 26th, this really is running it close to the wire. But then, what else is new!

Those of you who have been writing I really appreciate it. Your written comments become part of our data bank and to the extent that they identify helpful aspects of the procedures they are very useful. Obviously constructive criticism is also important.

The last enclosure is a very important work document. Entitled "Joint Research Outline", it is a copy of the outline which you and your host country colleagues will be working on together. Study it carefully and if you have any questions call us right away. Additional copies will be sent to you later.

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

PBM:bw

Enc.

MSU IS AN AFFIRMATIVE ACTION/EQUAL OPPORTUNITY INSTITUTION

INSTRUCTIONS FOR COMPLETING JOINT RESEARCH OUTLINE

This meeting is the initial effort between host country and U.S. scientists jointly writing a draft of important research they might undertake together which will strengthen some aspect of bean/cowpea production or consumption. Because of the complexity of bringing together two or more institutions representing (1) several sets of institutional directions, (2) different governmental priorities, and (3) a variety of individual professional interests, it should be clear that the agreements here are initial drafts. They must be reviewed by various officials. The proposal outlines should represent the resources of the actual researchers in the field reflecting the needs of the people of the host country for whom the research is to be done. Subsequently these research outlines must be (1) put into a global plan that can be recommended by the B/C planning office, (2) accepted by the involved institutions, and (3) ultimately approved by the appropriate offices of the respective governments. At any point in this process a country or an institution or a particular researcher active in the planning efforts may find further involvement inappropriate or discontinued.

The Joint Research Outline should reflect in its development the following USAID concerns:

1. Address attention to the non-production aspects as appropriate, as well as to the production aspects of a particular problem. U.S. and host country non-production persons should be identified as collaborators in a well developed plan. This refers in particular to the social, cultural or economic context of the identified problem.

2. Emphasis is to be placed on the needs of the small subsistance farm in the identification of specific research problems. This means that the research designs must include sites in traditional settings or in settings comparable in multiple respects to the traditional subsistence farms. Additionally, methods of feeding communications into the research from the subsistance farms should be indicated.

3. Approximately one-half of the total proposed budget must be spent in or on behalf of the host country (host country students in the U.S. and researcher travel included in this latter category). The total proposed budget includes both the Title XII appropriation and the U.S. institution matching funds (does not include any host country contribution).

4. Because of the active participation (sometimes exclusive participation) of women in bean/cowpea production as well as consumption, including marketing, attention should be paid to their needs and involvement in the program. Indicate the extent to which this is anticipated.

5. Documentation of the need for the proposed research should be appended if available or forwarded to the planning office soon after the joint meetings. Appropriate interviews as well as published materials may be part of that documentation.

Additional comments may be written on the back of the document if desired. There should be only one project per country. Since division of monetary resources will be calculated by country, recommending more than one project will mean a division of the amount apportioned to that country.

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 21, 1980

Dear Colleagues:

Yet another communication from the planning office.

On the travel - remember to fill out all documents relative to the countries you are visiting as a tourist. I realize there are temptations to indicate "business" on the forms since we all take ourselves quite seriously. But "business" generally means commercial business to these governments and we are not going to transact any of that. To avoid misunderstandings and being held up needlessly, always identify yourself as a tourist meeting with USAID mission people and University colleagues.

For some of you receiving this letter there are additional readings enclosed for your edification!

Those of you who have been writing I really appreciate it. Your written comments become part of our data bank and to the extent that they identify helpful aspects of the procedures they are very useful. Obviously constructive criticism is also important. Please forward to me copies of all correspondence with travel colleagues and potential LDC collaborators. All of this information will be supportive when we present the global plan to JRC.

The last enclosure is a very important work document. Entitled "Joint Research Outline", it is a copy of the outline which you and your host country colleagues will be working on together. Study it carefully and if you have any questions call us right away. Although the planning office representatives will have a few copies, it would be wise for you to take your copies with you.

We are coming right down to the wire with the grant. As of February 20, 1980, AID agreed to fund our proposal on a month-by-month basis. This requires submitting a budget by the first of each month for funds for the next month. Obviously, since we're all traveling budgets must be done in advance. Nonetheless, for your purposes all should work out with no inconvenience to most of you. Those of you planning to leave for Nigeria on February 26 are running close but I am still in hopes of having the funds released by Washington in time. Talk to me (351-6512 - home) or (355-4693 - office) on Monday, February 25.

Those of you going to the Malawi conference know by now that Malawi changed its mind--(seven American observers will not be too many) so the trip is on again. Immigration officials at the Port of Entry require a letter of invitation. Enclosed is a letter that may do, if the one we have requested with each of your names on it does not get through in time. Please take it with you. We should all arrive at the same time but there may be a slip.

Luck and a good and productive journey to all -

Sincerely,

Pat Barnes-McConnell
Assistant Coordinator
Bean/Cowpea Planning Program

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 25, 1980

TO: Travelling U.S. Scientists

FROM: Pat Barnes-McConnell, Bean/Cowpea Planning Office

SUBJECT: Travel procedures

Attached is a list of cities with the respective place of accommodation indicated. You must get from the airport to your hotel yourself. Ask airport officials for public transportation possibilities to your hotel, or if none available take a cab. In some cities cabbies are real husslers--use them as a last resort. At any rate, know the price before driving off.

Also attached is the list of contact persons for each country and their addresses.

During the regular work hours immediately following your arrival call the U.S. AID mission and ask for the person listed on your contact sheet (or his replacement). In at least one instance there has been a change in personnel since our communications began. (Trinidad people use Dr. John Spence, Dean of the College of University of West Indies, who sent a cable that he is expecting you. Phone # 662-7161/5. Inquire if, when and where meetings with the other contact people have been arranged. If none have been, you will have to get in touch with the other contact people yourself. They have been receiving communications from us and should be expecting you. Make sure you also meet with the Mission people either at the same time as the host country scientists or separately. The Mission people will give you valuable information about the state of relevan' research in that area and the political/social climate in which you must operate.

Remember, both in the case of the Mission people and the host country representatives--they are doing you a favor to adjust their routines to your schedule and your need to discuss research. Donor agency people come through all the time and usually with a lot more money than we will have. Some help, some do nothing much except waste time, and others actually leave things in worse shape than before they arrived. Therefore, a certain amount of cynicism and perhaps disinterest should be expected and respected. We are on their turf. Realistically, each of us is expecting to get something out of all this for ourselves, but the mutuality may not be apparent to all at first blush. You will be a diplomat--hopefully, a good one. Vigorously guard against being impatient, arrogant or condescending, either subtly or overtly. Think of how you would expect to behave if they showed up at your busy office and wanted to initiate joint research with you on their terms with a little bit of their money. Interesting feeling, isn't it!

In your talks with host country persons emphasize:

1. While there is not much money, at least initially, one of the biggest advantages of the program is the collaborative linkages among institutions which the U.S. and host country scientists should find invaluable over the years.

2. Make no promises. We are there to see if (1) the research they want to do (and to which they will make a commitment) matches with (2) the research our people want to do (and are capable of doing) in a way that (3) facilitates the overall global research plan in beans or cowpeas. You are there to help make the first two assessments. The final one, relative to appropriateness within the global context, can only be made when the data from all the visits are in. Your job is an extremely important one.

3. We are very concerned about training and assisting the host government build its research capabilities. If the host country appears interested in training, ascertain the extent to which women can be expected to be involved. Similar information should be obtained regarding the research proposed.

4. While changes in the Joint Research Outline can be suggested later, a completed outline must return with the Planning Office representative. The global plan with the matched countries, institutions, and researchers must be completed by the end of April for distribution and subsequent approval by JRC. The absence of a documented report from a country will have to mean automatic exclusion, at least at this point.

When preparing to leave a country, call or stop by the airline office the day before and the day of departure to confirm your reservation and the plane's schedule. Change your country money back but maintain enough for airport tax--the fee you pay at the airport to get out. Check on entry to find out what this is.

Remember before you begin this trip, send the Planning Office copies of all correspondence regarding this project. Part of our report will be the extent to which such communications took place, were necessary, and were useful.

For your health, we advise eating no raw vegetables and eating only peeled fruit. We suggest drinking only bottled beverages or beverages using well boiled water such as tea or coffee--this includes brushing your teeth.

Upon your return home an anecdotal report and analysis of your trip is expected. While we have not prepared a form for this, the information will be very important in our subsequent efforts. Everything should be in this office by the 15th of April: report, travel expenses accompanied by ticket stub (even if prepaid), etc. Planning Office staff will hit the ground running after the trips with a JRC meeting the first week in April followed by a series of other offical meetings and reports thereafter. We must rely on you to keep our pace!

Within the time we had, we have attempted to make this effort as efficient and smooth-flowing as possible. Undoubtedly, with 25 people from 12 institutions going to 15 different countries all at the same time, there are bound to be some hitches. If we're lucky, and patient, and use forethought maybe they can be kept to a minimum. From all we can tell, this is a model of collaboration that hasn't been tried before--a lot is riding on your efforts. From national and international comments received, we know that Washington and others are watching. Good luck!

Encs: (1.) Hotel list (2.) Contact persons list.

CITIES/HOTELS

Nairobi	- New Stanley Hotel
Dar es Salaam	- Agip Hotel
Lilongwe	- Capital Hotel
Cities in Nigeria	- Indicated Contact Persons making arrangements - responses not yet received
Ouagadougou	- L'Independance
Santo Domingo	- Lopez-Rosa to make own arrangements
Quito	- Peter Gore (Cornell) on site making arrangements, will return with information by 3/1/80
Trinidad	- Belaire Hotel, at airport, Port of Spain
Guyana	- Hotel Pegasus, Georgetown
Brazil	- Dr. Blumenschein (EMBRAPA) on site, making arrangements check at Guatemala meeting, with Dr. Adams
Costa Rica	- Balmoral Hotel, San Jose
Guatemala City	- Dorado Americana
Tegucigalpa	- Freytag to make own arrangements
Yaounde	- L'Independance Terminus Hotel
Dakar	- L'Independance

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF CROP AND SOIL SCIENCES
SOIL SCIENCE BUILDING

EAST LANSING • MICHIGAN • 48824

February 25, 1980

TO: Travelling U.S. Scientists

FROM: Kay Carter, Secretary, Bean/Cowpea Planning Program

SUBJECT: Travel Advance

We assume by this time you have received a copy of your travel schedule and know where you are going and when.

Your travel advance is being estimated according to per diem rates in the locations (overnight) shown on your travel schedule. In most cases the travel advance will be 75% of the total estimated per diem (based on overnight stays).

It is suggested that you take at least the 25% above the advance to take care of unexpected expenses, although when possible a Planning Office person (Dr. M. W. Adams, Dr. Pat Barnes-McConnell, Dr. Donald Wallace, or Ms. Dora Lodwick) will be present to assist in cases of emergency.

Per diem amounts pertinent to your trip are listed on the following page.

IMPORTANT: See my memo dated February 4th and attachments to see how foreign travel is figured, reimbursement for expenses, etc.

Enc.: Per diem list

P.S. Your travel advance will be forthcoming as soon as available.

MSU is an affirmative action/equal opportunity institution.

PER DIEM LIST FOR SCIENTISTS GOING TO AFRICA

Location	Per diem amount
Enugu, Nigeria	$93
Jos, Nigeria	93
Ibadan, Nigeria	93
Blantyre & Lilongwe, Malawi	60
Dar es Salaam, Tanzania	56
Nairobi, Kenya	55
Dakar, Senegal	82
Ouagadougou, Upper Volta	76
Yaounde, Cameroon	70
Paris, France	96

PER DIEM RATES FOR SCIENTISTS GOING TO LATIN AMERICA

Guatemala City, Guatemala	48
Panama City, Panama	50
Fortalezo, and Goiania, Brazil	55
Port of Spain, Trinidad	72
Georgetown, Guyana	55
Quito, Ecuador	58
Cali, Colombia	52
San Jose, Costa Rica	49
Santo Domingo, Dominican Republic	59

POSSIBLE
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